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"CONSERVATION OF WILD LIFE THROUGH EDUCATION"

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FISH CONSERVATION IN CALIFORNIA.

From the creation of the Fish and Game Commission in 1870, up to the present time, numerous steps have been taken to improve fishing conditions. Note some of the more important:

Some six species of trout, striped bass, two kinds of black bass, shad, crappie, catfish and several other varieties of food fishes have been successfully introduced into the waters of the state, thus adding much in the way of food and a great deal in the way of sport. Because of efforts along this line, the striped bass, famous among food and game fishes, flourishes in the streams of our state although practically gone in eastern streams. Many an eastern state would be willing to give millions to have the sport which California now enjoys.

Numerous protective laws, regulating the taking of fish, have been placed upon the statute books.

Pollution of fresh water streams by sawdust and by mining operations have been stopped.

Artificial propagation of trout and salmon having been demonstrated, numerous hatcheries have been built and equipped and the normal output now reaches 20,000,000 salmon and between 25,000,000 and 30,000,000 trout per year. Streams and lakes too numerous to mention, formerly devoid of fish life have been successfully stocked and innumerable depleted streams restocked.

These have been the accomplishments of the past and we now come to an important problem of the present. The building of dams in the larger rivers for irrigation and power purposes have formed barriers to migratory fish. These ocean-going fish, perhaps most desirable of all because of their size, are rapidly disappearing in all of those streams where spawning grounds are cut off by dams. Every large stream in the state has been thus injured with the exception of the Klamath River which is now the only stream containing a good run of king salmon and sea-run trout. Unless all the work of the past in fish conservation is to be destroyed and all the hope for the future banished, these runs of fish on the Klamath must be saved. They can only be saved by preventing the blocking of the stream near its mouth. Apparently, the saving of the Klamath can only be accomplished by the vote of the people on an initiative measure. Consequently, the California Fish and Game Commission, which has through the years done its utmost to conserve fish and game resources, now champions this fundamental conservation measure. Every conservationist must also rally to the support of the measure if the fight is to be won, for many interests are supporting the opposite side.

RELATION OF WILD BIRDS TO THE FOOT AND MOUTH DISEASE.

By WALTER P. TAYLOR, Assistant Biologist, Biological Survey, U. S. Department of Agriculture, and Harold C. Bryant, Game Expert, California Fish and Game Commission.

Whenever there is a severe outbreak of foot and mouth disease, such as that found in Merced County, California, the public seeks to find a tangible carrier of the disease. Lack of definite information, together with increasing alarm, sometimes leads to control measures which are too severe. Because of continued demand by authorities and owners of cattle in the infected districts in Merced County, that birds which might be carriers of the foot and mouth disease should be killed, the writers were detailed in March, 1924, to make an investigation of the relation of birds to the epizootic. Reports on former outbreaks of the disease in the United States indicate that domestic birds, such as chickens and pigeons, may carry the virus.

In 1902, in New England, it is reported that foot and mouth disease broke out in the dairy herd of a reform school. Later, it appeared among the cattle on a farm within sight of the school. The grounds of the reform school were surrounded by a high fence and there was no movement of persons or stock from the one to the other. An investigator noted a flock of domestic pigeons about the infected stock in the reform school yard; it is reported that individual pigeons habitually flew over the fence and dropped into the yard among the stock on the farm where the disease had secondarily broken out. In this case, the pigeons were the only connecting link that could be discovered.

At Merced there was a tendency to blame sea-gulls or ducks as being the only apparent links between the newly infected areas and those previously under quarantine, though later information regarding previous outbreaks has usually resulted in connecting human beings or domestic stock rather than wild birds or animals with dissemination of the disease. The object of the present investigators was to gather information on which to base intelligent policies regarding wild birds in quarantined areas.

On reaching Merced, March 29, conferences were held with Mr. Charles Poole, predatory animal inspector, Mr. Joseph Keyes, in charge of rodent control, and Mr. R. K. Stewart, directly in charge of the predatory animal campaign in the infected areas, all of the Biological Survey, of the U. S. Department of Agriculture; and with Mr. N. G. Buhn, in charge of the state work in predatory animal control; Doctors Rosenberger and Grafke, veterinarians in charge; and numerous other officials and residents.

On March 30, in company with Mr. Keyes, we investigated the infected areas and made a circle of over 60 miles through the quarantine district, the most important close quarantine tracts being visited and careful studies made of the birds. On March 31, we continued studies and interviews at Merced. On return to Berkeley, we consulted the veterinarians in charge of the campaign, and state and federal officials in Oakland, Berkeley, and San Francisco.

The Birds Concerned.

Species of birds found in such close proximity to infected animals that they might be accused of carrying the disease include the following:

Permanent Residents.
Mallard
Shoveller
Pintail
Bittern
Great blue heron
Coot
Wilson snipe
Killdeer
Turkey vulture
Sparrow hawk
Western red-tailed hawk
Black phœbe
California horned lark
Western crow
Bi-colored blackbird
Western meadowlark
Brewer blackbird
Linnet
English sparrow

Winter Visitants.
Baldpate
Gambel sparrow
Western savannah sparrow
Pipit

Summer Visitants.
Cinnamon teal

Transients.
Long-billed dowitcher
Marbled godwit
Western (?) sandpiper
Greater yellowlegs
Western willet

Other birds reported as occurring in the area and as being possible disseminators of the disease include sea-gulls (species not known—probably California and ring-billed), sandhill and little brown cranes, and geese of several species.

Evidence Favoring the Idea that Wild Birds are Carriers.

Cows afflicted with the foot and mouth disease drool constantly from the mouth; and it seems possible that such species of wild birds as blackbirds might scatter the virus by walking through this saliva on the ground, and then flying to an uninfected field near by. It seems reasonable also that turkey buzzards, in feeding on the carcass of an animal that had died of the disease, might pick up on their feet some of the excretions of the animal and then, being attracted to an uninfected field by a ground squirrel or other dead animal, might disseminate the infection.

Evidence Against the Idea that Wild Birds are Carriers.

1. There are so many different species of wild birds that feed among infected cattle, many of them being mere transients traveling across country on their migrations, that it would seem that the disease would be absolutely impossible of control if birds were actual carriers. We find, however, that under proper quarantine, there are many instances where the disease has been stamped out. Yet, probably, wild birds were among the most insistent violators of a strict quarantine in all these cases. It seems certain that the disease would spread much more rapidly if regularly transmitted by wild birds. Although birds are often abundant on the infected fields and continually moving about, considerable periods have already elapsed with no new cases outside those areas. Thus no new cases were reported from Merced during the forty-eight hours that we were on the ground, and no new cases in the bay region developed in the ten days following.

2. Cases of dissemination at first attributed to wild birds, on acquisition of complete history, have usually been found to be due to other carriers.

3. The wild birds most closely associated with infected animals, such as blackbirds and meadowlarks, are rather sedentary in habits at this time of year and, even if they do carry infection, are not likely to travel very far.

4. The water-inhabiting characteristics of such species as ducks, killdeer, coots, and herons probably result in their becoming free of infection very shortly after they have entered the water and thus minimize the possibility of their disseminating the virus. In addition, the contact with sunlight and air must soon be effective in destroying the virus. Leading veterinarians consulted by us on this point agree with this conclusion.

5. Consultation with six different state and federal veterinarians, concerned with control measures in California, failed to elicit definite proof that blame can be placed upon any wild bird as a carrier.

6. There is little or no evidence from foot and mouth disease districts in foreign countries that wild birds are carriers. For example a recent writer (Lieut. Col. Baldrey, Foot and Mouth Disease in India, Vet. Journ., Mar., 1924, p. 109) says: "Introduction from a foreign source may be by migratory birds, as has been suggested, but this is supposition and has not a single fact to substantiate it."

Psychological Aspect.

With thousands of cattle infected with the disease, it is no wonder that the whole population is greatly stirred and that there is continual pressure for the strict enforcement of every control measure that has been used or can be invented. Thus it comes about that those enforcing the quarantine have continual pressure brought upon them to destroy all animal life, including wild birds, which might be carriers. As a result of this it follows that the scientific demonstration of the precise relation of wild birds to foot and mouth disease would be most desirable, but unfortunately, this, at present, is impracticable, requiring, as it would, the time and attention of veterinarians who are already overloaded with the work of control. Furthermore, the veterinarians in charge of the local situation would apparently not favor this kind of experimentation, involving attempts to inoculate healthy stock from virus on birds' feet, on American soil. In fact, regulations prohibit such experimentation.

In the absence of complete knowledge of the relation of wild birds to the foot and mouth disease, any wholesale killing campaign would obviously be unwarranted. And even if migratory and resident wild birds were definitely known to be carriers, wholesale killing campaigns would not be justified, for they would be incomplete at best, and would result rather in dispersing than in restricting the disease.

Quarantine Most Reasonable Method of Control.

In every instance where there has been an outbreak of the disease in the United States, the most reasonable method of control has been found to be rigid quarantine, associated with destruction and burial of infected animals. Where quarantine and disinfection have been thorough, the disease has invariably been stamped out. Anything which breaks quarantine is dangerous, whether it be man or domestic or wild animal. Birds are impossible of control and continually break quarantine, leaving one infected field to feed in an uninfected one. With this in mind, several of the species of birds most likely to carry infection are here discussed:

1. *The turkey vulture*—This species is well known as a scavenger. It feeds upon dead animals and has been known to be attracted by cows

which have died of the foot and mouth disease. It is quite possible that this bird might pick up and carry virus on its feet or bill. The one saving thing is that the buzzard, after gorging itself usually perches on a near-by fencepost or tree for a considerable length of time—perhaps sufficient to destroy the virus. The possibility of danger would come from its alighting in an uninfected field to feed on some other dead animal. Unfortunately, buzzards are often difficult to approach closely and hard to kill; furthermore, shooting simply tends to drive them farther away. Quick burial of all dead animals would largely eliminate possible danger from the buzzard. But we believe the killing, whenever possible, of buzzards actually seen eating from carcasses of animals dead of foot and mouth disease, or loitering in the vicinity of the close quarantine area is a worth while precaution.

2. *Ducks, geese, and cranes.*—Geese and cranes feed in open pastures and are possible carriers. However, they are birds that are very wary and can be kept from alighting in the fields by use of blank shotgun cartridges loaded with black powder, tightly rammed down. Unless water is a carrier of virus, and this, according to the veterinarians, has not been scientifically demonstrated, ducks are not very likely to be disseminators.

3. *Blackbirds and meadowlarks.*—Bi-colored blackbirds and western meadowlarks, and particularly Brewer blackbirds, were continuously found feeding close to infected animals in just the places where they could readily pick up virus-laden saliva on bills and feet. Fortunately, these birds do not cover very great distances at this time of year, being instead, rather localized. Consequently, if *left undisturbed, they are least likely to infect new territory.*

Methods of Controlling Possible Wild Bird Carriers.

1. *Shooting.*—Shooting is perhaps the least desirable of the methods of control since it has a tendency to scatter the birds, and the infection as well, if birds are carriers. Continual shooting is very likely to drive water birds entirely out of the area, temporarily at least. Furthermore, this method does not permit of getting a very large percentage of the birds concerned. There are always many that escape as against few that are actually destroyed.

2. *Trapping and netting.*—In this method we again have an ineffective and impracticable measure, for only a portion of the birds would be secured, the others escaping to continue the dissemination.

3. *Poison gas.*—Trials by the U. S. Biological Survey with poison gas for killing blackbirds have brought unfavorable reports as to the efficacy of this method. It has been shown that the gas, being unconfined, disseminates quickly and it is doubtful whether birds can be killed in sufficient numbers to promise results of importance.

4. *Poisoning.*—In this method we find perhaps the best method of control. There is less disturbance to the birds and if they can be induced to take a poison which would kill them, the destruction is often great. The main difficulty is that oftentimes the bait offered is not accepted and attempts to poison do not result favorably. There is also danger of destroying the innocent with the guilty. The only species the poisoning of which would be at all justified in the present emer-

gency, are blackbirds and turkey buzzards; no satisfactory means for poisoning blackbirds on an effective scale are known. With buzzards the use of strychnine in meat may be worth trying, but at present promises little real relief; buzzards are often able to rid themselves of poison by regurgitation.

It is to be borne in mind, however, that *officials charged with the application of measures for the control of birds* may even be more dangerous potential carriers of infection than the birds themselves.

Conclusion.

The present foot and mouth disease situation emphasizes some of the difficulties in which the community finds itself as a result of failure to generously support scientific investigations. Unpreparedness in crises such as this results in enormous losses to the community and illustrates the wastefulness of so-called economy campaigns in state and federal governments, which, through a reckless reduction of the appropriation estimates, interrupt, handicap, or even stop scientific research and educational work. The many unknown factors in the present emergency lead to unwarranted and unscientific attempts to control the disease. The suggestion of wholesale killing or poisoning of wild birds in quarantine areas is one of these unreasonable developments. The precise relations of birds and other wild animals to foot and mouth disease can be determined only by long-continued and careful studies by competent scientists. The missing link in the chain of evidence is the infection of known healthy stock with virus from the bills and feet of wild birds.

Summary.

1. We have been unable to secure any positive proof that wild birds are actual disseminators of the foot and mouth disease. Wholesale killing campaigns, therefore, would be wholly unjustifiable; furthermore, such campaigns, even if birds were demonstrated to be carriers, would be likely to do more harm through scattering the birds escaping than good through killing of potential carriers.

2. Since it is reasonable to suspect that the turkey vulture may be a carrier of the disease, we recommend the killing, if possible, preferably with poison, of any buzzards noted on infected pastures or in the vicinity of carcasses of cattle which have died of the disease.

3. We believe that blackbirds, meadowlarks, and other birds of similar ground-living habits should not be frightened or molested in any way on infected premises, or otherwise, because they are so numerous that it would be impossible to destroy them all by any known means and because shooting or frightening the birds would be likely to do more harm in scattering the virus than good in killing potential carriers. No adequate method for poisoning blackbirds is known; the less these birds are disturbed, the more likely they are to stay in the immediate vicinity and not break quarantine.

4. Where large flocks of geese and sandhill cranes try to alight in infected fields, frightening by shooting, using blank cartridges loaded with black powder, would seem to be the most reasonable method of handling the situation; but we are satisfied that shooting is, in general, an undesirable method of control in that it tends to scatter birds widely and thus, possibly, render quarantine measures less effective.

5. Water birds, such as ducks and waders, would be unlikely, according to veterinarians, to disseminate foot and mouth disease, because of their repeated washing of feet and bills in water and their free contact with sunlight, which is known to be an effective disinfectant; chlorination of smaller ponds of water in infected fields would be a justifiable precaution.

6. Serious losses result to the community through the adoption of unreasonable control measures; the suggestion that a wholesale bird-killing campaign be entered upon belongs in this category. The many unknown factors in the foot and mouth situation, associated with the alarm caused by its spread, almost put a premium on the proposal and adoption of such unjustified measures. A crisis such as this emphasizes the wastefulness of a penny-wise program on the part of state and federal governments which fails to give adequate support to the scientific research and education which are essential to community preparedness for emergencies of this kind.

A THIRD REPORT ON THE RETURN OF KING SALMON MARKED IN 1919 IN KLAMATH RIVER.

By JOHN O. SNYDER, Stanford University.

In the fall of 1919 the Fish and Game Commission made an experimental planting of marked king salmon in Klamath River, in an attempt to obtain additional facts relating to the oceanic migration of the species, and also as a further test of the so-called parent stream theory. The experiment was successful. A number of the mature fish were intercepted in their return migration in Klamath River, and some were caught at sea. Short papers describing the experiment and some of its results have appeared in this publication.[1] A brief resume of these is here given together with an account of the marked fishes caught in 1923.

The experiment was started in November, 1918, by the transfer of a large number of king salmon eggs from Mill Creek, a tributary of the Sacramento River, to the Fall Creek Hatchery which is located on a tributary of Klamath River. The resulting fry were placed in ponds where they were kept until November, 1919, when they were liberated in Fall Creek and allowed to pass down into Klamath River. It will be noted that although these fish were of Sacramento River parentage, they were reared in the water of a Klamath River tributary. Before liberation a considerable number were marked by removing the adipose and right ventral fins, an operation which apparently disturbs the fishes but little, there being practically no loss as a direct result of it. Adult fish with mutilations of various kinds are frequently found, but the absence of two fins is so unusual as to attract attention at once.

The first capture of any of these fish occurred in the fall of 1921, when grilse, or three-year-old males, appeared at the racks at Klamathon, about 14 miles below the mouth of the stream in which they were liberated. Twenty-three fish were taken from October 24 to November 14.

Nothing further was heard of marked fish until June 7, 1922, when one was secured in Monterey Bay. Another was taken in the same

[1] Vol. No. 6, No. 3, July, 1920, page 101.
Vol. No. 8, No. 2, April 1922, page 102.
Vol. No. 9, No. 1, January, 1923, page 1.

locality June 14. One was caught near Point Reyes, July 7, another near Cape Mendocino, August 5, and finally four near Redding Rock, farther up the coast, July 21 to August 3; these completing the ocean catch. As the mature fish entered the Klamath, one was secured near the mouth of the river, August 14. Fifteen came to the Klamathon racks between October 19 and November 15.

The fin scars and also some scales were preserved from all these fish, the scales aiding in identification, as their structure indicated that they were pond reared fish, three or four years old as the case might be.

The scales served another purpose, for upon a close examination with the microscope it was recognized that they possessed peculiar structural characteristics which would serve to distinguish them, even among those of thousands of their species. One of these scales is illustrated by a photomicrograph, Plate 1. Here there appears the usual nucleus A, which represents the hatchery and pond growth after scales began to develop, and also the winter checks D and E, which mark the end of active growth for the second and third years respectively. Similar characters are present in practically all scales from fish with a similar life history. In addition to these, there are present in the scales of the marked fish two secondary checks, one at B and the other at C. Somewhat similar secondary checks may be occasionally found in large series of king salmon scales, but they have not usually proved to be of any particular significance. In this case however, they are of unusual interest as will be seen.

That the structure of the scale presents, in a measure, a record of the growth of the fish from which it was taken, was discovered long ago by investigators, and the statement may now be accepted as a well established fact. In this case then, the point B may be taken to represent a time in the early life of a fish after which a period of very rapid and even growth prevailed. The record of this flourishing period extends to C, when, because of some adverse circumstance, possibly lack of food, a check or retardation of growth occurred. Rapid growth was then resumed, only to be again restricted when the final winter check of the year appeared at D. These events, so plainly reflected by the structure of the scale, must have taken place in the interim between the time at which the fish entered the river and the end of the second year of growth. The same events are recorded by the same distinctive structure and in the same sequence on the scales of all the marked fish which have been recovered, thus plainly indicating that they were all subjected to the same environmental conditions for at least two years, possibly assembled in the same large school.

When the marked fish to the number of 25,000 were liberated, a much larger number with exactly the same history, but without fin mutilations, were allowed to escape into the river. Since the marked ones showed evidence of close association during their life at sea, it was presumed that at least some of those not marked would bear evidence which would permit of like interpretation, if we were fortunate enough to capture them. Such was found to be the case, for unmarked grilse with scales of similar structure were found among the few which had been preserved from those which appeared at the racks in 1921.

Acting under the supposition that fishes of this experimental planting might be found schooling together at sea in 1922, in the fourth year of their age, observers were requested to examine all fish in each

boat which contained a marked individual in the catch. Several fishes unmistakably identified with this planting, though without marked fins, were found associated with the marked ones. The characteristic structure of the scales, the age, size, and stream history were in such close agreement with the marked fish as to leave no doubt as to their identity. A scale of one of these is illustrated in Plate 2.

This account brings the results of the experiment down to the year 1923, when twelve fish bearing the distinctive mark were caught. These were then in their fifth year, and they may be regarded as the last returns of importance which may be reasonably expected from this marking experiment. This prediction is largely based on an inspection of 1500 Klamath salmon taken without selection from a season's catch at the mouth of the river. The ages of these as determined from the scales were as follows: Three-year fish 179; four-year fish 949; five-year fish 347; six-year fish 25. These include individuals which migrated to sea at an early date, as well as those which spent approximately a year in the stream. Separating the latter which in life history correspond with the experimentally planted pond fish we have: Three-year fish 15; four-year fish 141; five-year fish 188; six year fish 8. This indicates that a very small percentage of Klamath River fish which have spent the first year in the river, reach the age of six years. However, it is to be noted in this connection that these marked fish are of Sacramento River parentage, and it is not known whether or not a larger proportion of six-year individuals may be found among Sacramento River fish.

Of the twelve marked fish collected in 1923, one was taken near Fort Bragg, another off Cape Mendocino, two in the estuary of Klamath River, and eight at the Klamathon racks. A summary of the data relating to these fish is here presented.

SUMMARY OF COLLECTOR'S DATA RELATING TO MARKED FISH TAKEN IN 1923.

Catalogue number	Date	Locality	Sex	Length, cm.	Collector
21787	June 8	Off Fort Bragg	F.	85	W. F. Kemppe
21788	July 17	Cape Mendocino	F.	78	Western California Fish Company
21789	Aug. 17	Klamath estuary	F.	87	Frank Isles
47846	Aug. 31	Klamath estuary	F.	78	William Pundlebury
21791	Oct. 24	Klamath racks	F.	90	E. C. Scofield
21790	Oct. 25	Klamath racks	F.	97	E. C. Scofield
21792	Oct. 25	Klamath racks	F.	92	E. C. Scofield
21795	Nov. 5	Klamath racks	F.	103	E. V. Cassell
21796	Nov. 7	Klamath racks	F.	104	E. V. Cassell
21797	Nov. 15	Klamath racks	F.	87	E. V. Cassell
21798	Nov. 15	Klamath racks	F.	93	E. V. Cassell
21799	Nov. 15	Klamath racks	F.	84	E. V. Cassell

It will be noted that the fish recorded in the table are all females. This sex representation is not in agreement with that of six-year-old Klamath River fish with a similar stream history, where males as well as females are present.

In 1923 the marked fish were found at the racks between October 24 and November 15; in 1922, from October 19 to November 15; in 1921, from October 24 to November 14. While there is here presented a remarkably uniform record of migration, it might also be taken to indicate that individuals straggled along and reached the locality one after another between the earlier and later dates. Such may not have been the case. If the marked fish arrived in a single school, it would

PLATE 1.

FIG. 23. Photomicrograph of a scale of a king salmon of the 1919 marking experiment. Photograph by J. O. Snyder.

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FIG. 24. Photomicrograph of a scale of a salmon taken off Cape Mendocino, August 5, 1922, which although not marked is identical with the experimental planting of 1919. Photograph by J. O. Snyder.

be some time before all found their way through the valves of the lower rack, and after entering the trap a fish might easily avoid the collecting seine for several days. At the estuary of the river one was recorded August 17, and another August 31. There is evidence to indicate that fish may linger in the estuary before progressing farther on the up-stream migration, and it is quite possible that both these individuals entered the river at the same time, one having succeeded in avoiding the nets for a longer time than the other.

The mature marked fish (river examples) taken in 1922 measured from 69 to 86 centimeters long, the entire sixteen averaging about 78, while those secured in 1923 measured 78 to 104 centimeters, with an average of 91.5. Five-year females to the number of 40, with a similar stream history, taken at random from fish at the mouth of the river, measured from 79 to 102 centimeters, the average being 89, somewhat smaller than that of the marked fish.

Certain anatomical features were described as peculiar to the scales of fishes heretofore found with the 1919 mark. The scales of those taken in 1923 were similar in every respect to those of former years, except in the additional growth. The nucleus A, the change in growth at B, the secondary check at C, closely followed by the winter check at D, and the other winter checks following in regular order, were present in every detail.

In an attempt to discover unmarked salmon of the 1919 planting among those taken in the estuary of Klamath River, search was made among the scales of several hundred fish caught a few days preceding and following the dates upon which marked fish were taken. Two such fish were recognized, their scales being like those of the marked ones in every essential detail. These were caught August 14 and 16. They were both females and measured 93 and 78 centimeters respectively. Curiously enough, a marked fish was caught at the same place on August 14 of the preceding year.

The eggs of some of the marked fish were counted and it was found that the average number taken from the four-year fish was 4904, and that from the five-year fish 5588. An enumeration of ova, gillrakers and stomach cæca is presented in the following table:

Number of eggs	Gillrakers	Caeca	Length	Age
4800	23	147	74	4
5528	24	182	79	4
4688	24	163	86	4
5621	23	151	86	4
3881	—	171	72	4
3759	—	139	87	5
6990	25	155	90	5
6296	24	170	92	5
7564	24	170	97	5
3329	26	122	78	5

SUMMARY OF DATA RELATING TO THE CAPTURE OF FISH MARKED IN 1919.

Locality	No.	1921	No.	1922	No.	1923
Monterey Bay			2	June 7 to 14		
Off Point Reyes			1	July 7		
Off Fort Bragg					1	June 8
Off Cape Mendocino			1	August 5	1	July 17
Redding Rock			4	July 21 to Aug. 3		
Klamath Estuary			1	Aug. 14	2	Aug. 17 to 31
Klamath Racks	23	Oct. 24 to Nov. 14	15	Oct. 19 to Nov. 15	8	Oct. 24 to Nov. 15

SUMMARY OF DATA RELATING TO THE CAPTURE OF FISH WHICH WERE RELEASED WITH MARKED FISH, BUT WERE RECOGNIZED BY CHARACTERISTIC SCALE STRUCTURE.

Locality	No.	1921	No.	1922	No.	1923
Off Cape Mendocino			4	Aug. 5		
Vicinity Redding Rock			2	Aug. 1		
Klamath Estuary					2	Aug. 14 to 16
Klamath Racks	3	Oct. 22 to 25				

SUMMARY.

The results of this experiment seem to fully warrant a continuation of similar investigations. Briefly summarized:

They are in accord with previously observed facts relating to the return from the ocean of pond bred king salmon to the stream in which they were reared.

Salmon return to the stream in which they were reared rather than to that of their real parentage.

In seeking the parent stream on their return migration, they may pass the mouths of other rivers in which the same species is native.

The nuptial migrations of individuals with the same stream history, but of different age groups, are very regular in time.

Artificially propagated king salmon appear to reach about the same age and stature, and to attain about the same yearly growth as others.

There is evidence which leads to the inference that king salmon after entering the ocean may remain together in the same locality or migrate in the same school for one or more years, possibly throughout life.

King salmon may range a long distance at sea from the mouth of the parent stream, a discovery of importance in relation to conservation.

THE FUTURE OF THE BEAVER.

By George Neale.

Before the era of reclamation of lands in the Sacramento and San Joaquin valleys the beaver (*Castor canadensis subauratus*) thrived in every body of fresh water. All the sloughs, rivers and lakes abounded with them. The early pioneer hunters and trappers reaped an annual harvest of furs—beaver, otter and mink. A record of the number of the furs taken in these periodical overflowed areas is almost unbelievable.

Every fur trapper had his own trapping line and territory and each was known as Jim Blank's trail and respected as such. Among the well-known and, possibly, the best of the trappers were the French Canadians, the La Montagnes, who trapped most of that territory then known as the Big Lake country, but now known after reclamation as the Netherlands and Holland districts. It was then also the winter home of millions of wild waterfowl of nearly all species. This same territory now is a garden spot of northern California.

The construction of the immense levees necessary on the exterior boundaries for the reclamation of the districts forced the beaver into canals from which the construction material was taken, thus confining the beaver to a very small area. There being no protection for them brought them near to extinction in 1911.

The writer advocated a closed season which our Commission succeeded then in passing, protecting them at all times. While the Fish and Game Commission have no record of any inundation or damage caused by these animals burrowing or bedding in the levees, many complaints came to the office of danger to the flooding of crops. This grew to such an extent under protection that in the year 1917, the law of 1911 was amended, empowering the Fish and Game Commission to issue permits to kill them when found necessary.

So valuable had the furs become under this protection that many subterfuges were, and are now, used to have permits issued to kill them. Before a permit was issued an inspection was made of the alleged danger and if necessary a permit was issued. In making the inspections the Commission learned that the interest in securing a permit in many instances was for the purpose of owning a beaver garment or for the value of its fur. To avoid this scheme and in the interest of conservation, a novel plan to preserve the animals has been worked out. A beaver farm is maintained near Taylorsville, Plumas County, stocked with beaver secured from the state of Arizona, by men familiar with the peculiarities of this mammal. The Commission has been fortunate to secure the services of these men in catching alive the animals which are supposed to be damaging levees or trees. The beavers so caught alive are used for the purposes of propagation under permit and for restocking areas barren of them.

It is astonishing how little is known of this wonderful animal even by those who are so fortunate as to wear his fur. An adult beaver weighs from 50 to 55 pounds; is from 32 to 38 inches long. It is mostly nocturnal in its habits but may be seen early in the morning or late in the evening.

The writer has seen trees of 20 inches in diameter cut down in one night. Their food consists of the barks of several varieties of trees growing in or near water, tule roots and especially the bulb known as tule potato. They will attack fruit trees if hard pressed for food, especially those trees of the sweet fruits such as plums, peaches, apricots and prunes.

The young are from one to four, generally three in number. It is said by men who know, that when the young born in the lodges or dens are old enough to care for themselves, the parent animals seek a new home leaving their abode to their children.

LOSS OF DEER IN THE CANAL OF THE WESTERN STATES GAS AND ELECTRIC COMPANY, EL DORADO COUNTY.

By George Neale.

On December 14, 1923, Deputy Euell Gray of Placerville notified the Sacramento Office that a number of deer had perished in the canal of the Western States Gas and Electric Company situated near the American River, thirty miles above Placerville.

The canal is about thirty miles in length, the first six or seven miles of which is of concrete construction, both on the sides and the bottom.

The deer coming from the higher elevations to their winter range, north in the vicinity of Big Ben, follow the high range of hills along the south side of the American River and at Alder Creek they follow

the east slope to the river where they cross to the north slope. Immediately before reaching the river it is necessary for them to cross the concrete canal. As the canal is of recent construction and there being no precedent to go by, both the Commission and the power company were at a loss to know how to handle the situation.

At the loss of the first few deer by drowning, the Western States Gas and Electric Company put in nine bridges across their canal at the particular point where the deer get into the water. The width of these bridges were from four to fifty-four feet. The boards were covered with earth but, being of new construction, the deer were afraid to cross the bridges. The company also put in ladders along the side of the canal

FIG. 25. This attempted means of saving deer from the ditch of the Western States Gas and Electric Company above Placerville proved unsuccessful as deer were afraid of the ladders. Photograph by Euell Gray.

and one pair of steps that reached across the ditch and to the bottom of the water. These also failed to effect their escape as they fought the water and the concrete until their feet were entirely worn away and their knees worn to the bone. In many instances the front legs were broken.

A patrol service was established along the ditch, night and day. Recommendations were made to the company that they immediately fence the concrete canal on the upper and lower sides. Owing to the short time in which to act and the company not having the wire on hand, they were unable to do any fencing.

At the end of December, snow commenced to fall which hurried the migration of the deer northward and kept the rescue crew busy night and day. As many as 38 deer were taken from the canal in one hour, thirty of which were liberated unhurt and eight of which were dead.

At this time tracks showed that the bridges were being used by many deer. A report was made by Deputy Gray to the Fish and Game Commission every few days between that period and January 14, 1924. In the latter report he states, "I have just returned from a two days' trip to the Western States Gas and Electric Company's ditch. After going as far up as Riverton by auto the rest of the distance, about ten miles, had to be made on foot owing to the heavy snow. Along the seven miles of concrete lining, the company was maintaining Camp 'C,' at the head of the ditch, with two patrolmen; Camp 'G,' 34 miles from Camp 'C,' with four patrolmen; Camp 'S,' one mile from Camp 'G,' with one patrolman. Camp 'X,' at the foot of the concrete

FIG. 26. Another method tried was that of a ladder suspended across the ditch, but ice soon formed which clogged the ditch and the ladder had to be removed. Photograph by Euell Gray.

canal, with nine patrolmen. Each of the camps kept a daily record of the deer taken from the canal alive and dead. This record was started daily on the first of January but a total record was kept from the 14th of December when the first deer were drowned."

Our records show as follows: Camp "G" taken out alive 220, dead, 96; Camp "S" alive 115, dead, 2; Camp "X" alive 43, dead 15. Total alive 425, dead 113. It is estimated by the patrolmen that for every deer that got into the ditch, five got out or used the crossings.

Deputy Gray states as follows: "I believe that this is a very conservative estimate as Mr. Loughland and myself checked up on three different occasions where the deer had crossed the road from the canal. Taking these figures as correct it would show that 541 deer have been taken from the canal. Two thousand eight hundred fifty-five have used crossings or got out of the canal, where that portion of it was not

concrete, on their own accord. This seems a large number of deer to use a seven mile crossing but when you figure the area of country where these deer come from the number does not then seem so large. Several hundred deer will yet use these crossings as the daily report shows that from 10 to 25 are being taken from the ditch alive daily. There was still, at this time, twenty inches of snow which makes it impossible to do fencing this winter. There will probably be a few deer lost yet in the canal but I do not expect any large number as the big run of deer is over."

After much correspondence with the officials of the Western States Gas and Electric Company a meeting was arranged in Placerville with representatives of the company, the Forest Service and the Fish and Game Commission, to devise ways and means to remedy the deplorable condition.

Mr. Loughland, the resident engineer of the power company, stated that his company would do everything possible and would spare no expense in order that this should not occur again.

Mr. Neale, the executive officer of the Fish and Game Commission, recommended that a high fence be maintained along the exterior boundaries of the concrete portion of the canal with wide bridge crossings every two or three hundred yards.

It was suggested that Deputy Euell Gray, who acted as chairman of the meeting, act as a committee of one to learn if there was any wire fence that could be permanently maintained at that elevation. Several of those present stated that they had wire fences still standing which had remained standing in the snow region for nearly twenty years.

Mr. Gray's report is as follows:

FISH AND GAME COMMISSION,
Sacramento, Cal.

GENTLEMEN: In compliance with instructions given at a meeting held in Placerville on February 9, 1924, between officials of the Western States Gas and Electric Company, Fish and Game Commission, and sportsmen and business men of El Dorado County, to discuss the deer loss in the concrete canal belonging to the Western States Gas and Electric Company, and its probable remedy, I herewith submit a report of my findings on a fence sufficient in strength and height to withstand climatic conditions and act as a barrier against which deer will not cross.

A fence 8 feet high, consisting of 5 feet of stack netting, (No. 9 wire, top and bottom, with No. 7 wire between) with a mesh not greater than 5 inches, with three strands of Glidden barbed wire on top. Posts to consist of cedar, 8-inch face, 7 inches thick, and 10 feet in length, two feet to be set in ground and spaced not greater than ten feet. Trees to be used for posts when possible to add strength and prevent snow slip.

A fence constructed with these specifications will be a positive preventive aganist deer getting into the canal.

Good earth crossings should be put across the canal at the natural deer crossing, and the fence should slope to the bridge which should be not less than twenty feet wide. These bridges should be put in every fifteen hundred feet to avoid the deer from jumping the fence in deep snow.

I inspected two fences, that were built on the Rupeley ranch thirty years ago made with 5-inch cedar posts which are in perfect shape. I believe a fence constructed after specifications enclosed would last thirty years at least.

The fence below the canal need not be more than 7 feet high as the steep hillside would not allow a deer to jump a 7-foot fence.

A 10-foot right of way should be cleared along the outer side of the fence to allow the deer to pass along to crossings.

Very truly yours,

(Signed) EUELL GRAY.

The most remarkable thing in connection with this is the large number of deer ranging in the district. The deer ranging on the southern divide migrate by way of the Silver Lake country and do not cross the South Fork of the American, consequently it is safe to assume that there are as many deer in the northern divide area as in the southern.

Many of the rescued deer, apparently dead from exposure, were brought to life by being thawed out before a huge bonfire. A number

FIG. 27. Rescuing deer from the canal with twenty inches of snow on the ground. Bucks were difficult to handle. Unless rescued within an hour the deer froze to death. Photograph by Euell Gray.

of the deer were tagged and liberated and a record kept for future reference. It will be interesting to learn later when and where these animals are killed. A severaly injured deer that could not recover was mercifully killed and given to county hospitals, orphanages and the Folsom state prison.

This is a remarkable contradiction to the statement by the director of the New York Zoological Garden, that "a live wild deer in California, is a curiosity."

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All material for publication should be sent to H. C. Bryant, Museum of Vertebrate Zoology, Berkeley, Cal.

August 15, 1924.

No nation can grow populous and great and long survive, which, through lack of vision, continues to destroy those very resources which have made it great.—B. W. Evermann.

FISH AND GAME COMMISSION SUPPORTS CONSERVATION MEASURE.

On April 29, at a regular meeting of the Fish and Game Commission it was decided to actively support an initiative measure to create the Klamath River Fish and Game District and prohibit the construction or maintenance of any dam or any other artificial obstruction in the waters of said district. The decision to support such a measure was made entirely on the basis of conservation. The main function of the Commission is to protect fish and game. Since the last run of salmon and sea-run trout is to be found in the Klamath and since the only means of satisfactorily protecting these fish and perpetuating supply for the use of future generations depends upon their reaching their spawning grounds, and since there is no known means of solving the problem presented by a 250-foot dam, the decision was made to attempt the formation of a fish district and the blocking of present plans to build large power dams in the Lower Klamath.

From the first filing of petitions to the Federal Power Commission the Fish and Game Commission has opposed this development on the Klamath on the grounds that it would destroy a valuable natural resource and that added power development was not absolutely necessary at this time. The application was successfully blocked for a time due to the decision of the Federal Power Commission to demand the approval of the Division of Water Rights of California before acting. Several hearings followed and finally, during April, the Division of Water Rights granted the applications of Mr. Jackman for 9000 cubic feet of water, and two applications of the Electro-Metals Company, each one covering 3000 feet of water. The matter is now up to the Federal Power Commission but this commission has been asked to defer action until a vote on the matter can be had through an initiative measure to be placed on the November ballot.

If the thousands of names necessary to place this matter before the people through an initiative measure are secured, the people of the state will have their first opportunity to show how they stand on an important fundamental conservation measure. Most of the natural resources of the state have already been parceled out and it will be interesting to see whether the people desire to save native resources such as fish or power sites.

Let it be clearly understood that the only chance of saving both trout and salmon in our state lies in the saving of at least one stream which furnishes suitable feeding and spawning grounds. The Sacramento and San Joaquin rivers, which once furnished a splendid supply of these fish, are now depleted and pollution and the building of dams precludes any hope for the future. Furthermore, let it be understood that the Klamath will be kept free and open to all anglers and will not be usurped by private fishing clubs, for already a law on the statute books provides that a right of way may be maintained along any stream, containing fish planted therein by the state, for the use of fishermen.

Many mountainous areas in the state are being developed as private recreation grounds, each person buying a membership in a club. These clubs are always interested in hunting and fishing and one of their first ideas is to heavily stock the streams or, in any instance, to dam up streams and create large lakes to be stocked with fish. Having made such plans, they demand fry for stocking from the Fish and Game Commission. It should be clearly understood that the state does not stock streams which are designed for the sole use of members of a club. Furthermore, there is a law which makes it illegal to close up streams and establish private fish reserves which are not open to the public. In other words, it is illegal to screen off sections of a stream containing fish and utilize the same for personal advantage. The Commission is opposing all such efforts and is attempting to keep angling free and open to everyone.

PRESIDENT NEWBERT'S STATEMENT.

To the people of California, and the thinking people of the U. S. A., I say the U. S. A. because it will affect the pleasure and the business interests of the world if dams are constructed on the Klamath River.

The Klamath River, the greatest salmon and rainbow trout stream in California, is about to be given away to a private corporation for power sites. After all other legal means were exhausted the people of Siskiyou County found it necessary to try an initiative measure to save the fish in the Klamath River, the spawning grounds of the last big run of salmon and rainbow trout in the state. The supervisors of Siskiyou County voted one thousand dollars, April 7, to start a campaign to save the stream from spoliation. Your financial and moral support is needed in this movement.

The Klamath River must be saved as a fish refuge to furnish eggs for the future stocking of our 26,000 miles of streams and hundreds of lakes. On the Klamath River the Fish and Game Commission takes most all of its salmon eggs and wild rainbow trout eggs for its hatcheries. We repeat, therefore, that if great dams are constructed, which at this time are not necessary, the last run of salmon and rainbow trout in California will be destroyed.

It is a fact that the proposed potential hydro-electric power on other streams in this state will supply the people in California for the next thirty years. Why destroy one of the greatest of our natural resources until necessary?

There are applications now before the State Division of Water Rights and the Federal Power Commission for permission to construct three dams on the Klamath River—one 250 feet high, another twenty miles below, 90 feet high, and still another twenty miles below the latter, 90 feet high—three dams in a distance of forty miles. If these dams are constructed they will form an impassible barrier to salmon and exterminate this species of fish, a valuable food supply to the State of California.

The run of fish in the Klamath, a non-navigable river, not needed for irrigation, a river safe from pollution, thus forming one of the most wonderful natural fish refuges in all California, must be saved if the Fish and Game Commission is to continue with its propagation work. California needs more fish life, not less. We have watched the great migration of sea-run fishes in the San Joaquin, Calaveras, Kern, Merced, Mokelumne, Stanislaus and Tuolumne rivers, the Sacramento with its immense tributaries, the American, Feather, Yuba, McCloud and Pit rivers with their 17,000 miles of tributaries, including many other streams that run to the ocean, slowly but surely disappear.

Our great industries in California today are fisheries, farming, hydro-electric power and manufacturing. With the careful development of all these great industries and others, California will soon be made one of the safest business and pleasure states of our Union, a state that will withstand any slump in business or underproduction of any product. Our problems, however, must be worked out as a unit; we must link together the industries of our state by admitting that the farmers' interest is our interest the same as all other industries.

California is an empire within itself, with fisheries that led the Union in 1920, producing a pack worth $25,000,000, most of which was exported. This great pack of salmon, sardines, tuna, shad, and other species of our ocean and streams, will be greater this year than in 1920. This is a business that belongs to the people of California, a state resource keeping more than 14,000 people at work, and causing an investment of more than $12,000,000. It is a self-supporting industry costing the general taxpayer nothing. Your legislature has made laws that have protected and built up this natural business.

We should not let any corporation or any set of men destroy any branch of it until it becomes necessary. Cooperation with the California fisheries must be had from all other great industries of the state.

It is upon the very theory of conservation, of building and not tearing down that the members of the Fish and Game Commission, M. J. Connell, G. H. Anderson, and F. M. Newbert, voted as a body to help the Klamath River Conservation League to make the Klamath River a fish refuge. Get your name on the petition, or better still if you are interested, and a voter, send for a petition and help along this great work, and then vote to save for future generations, the last run of salmon and rainbow trout, in California.

The time is here when the natural resources of our state should be conserved, for the attention of the world is upon California, both in business and a pleasure way.

F. M. NEWBERT,
Fish and Game Commission.

COMMISSION FUNDS MADE AVAILABLE BY SUPREME COURT DECISION.

The decision of the Supreme Court of California in the recent case of *Board of Fish and Game Commissioners* vs. *Ray L. Riley, State Controller*, etc., 67 Cal. Dec. 581, has had the effect of entirely relieving the very critical situation with respect to the funds and activities of the Fish and Game Commission and also of certain other important Boards and Commissions of this state whose special funds were in danger of being "frozen" until the next session of the legislature. The Fish and Game Commission is especially grateful for this relief because of the fact that the amount which had been allowed it under the budget bill was practically exhausted and that the period of its greatest activity in the way of conserving the fish and game resources of the state of California was at hand.

This important case had its inception in an application on the part of the Fish and Game Commission to the Board of Control and to the Governor for permission to create a deficiency and to draw upon the special Fish and Game Preservation fund in the state treasury for its payment. This action was taken in conformity with the provision of section

FIG. 28. Principals in the decision which released the frozen funds of the Fish and Game Commission. From left to right: Hon. Friend Wm. Richardson, Governor of California; Hon. Louis W. Myers, Chief Justice of the Supreme Court of California; Hon. John W. Shenk, Associate Justice of the Supreme Court of California; Hon. Juan E. Richards, Associate Justice of the Supreme Court of California, who wrote the decision in the budget case.

680 of the Political Code, which purported to authorize the Board of Control, with the approval of the Governor, to create such deficiency and to order the payment of claims arising therefrom out of whatever special funds were in the state treasury applicable to such uses. At the time this application was made the special Fish and Game preservation fund in the state treasury amounted to approximately the sum of $280,000. The Board of Control passed an order in accord with such application and Governor Richardson approved the same, but the State Controller, in order that he might be perfectly protected in his allowance of the claim thereupon presented by the Fish and Game Commission in accordance with said order, insisted upon a decision of the Supreme Court justifying and commanding such allowance. The Fish and Game Commission thereupon brought this proceeding before the Supreme Court seeking a writ of mandate to compel the State Controller to approve and allow its said claim. The matter was presented to the Supreme Court *en banc* at its recent session and the court handed down its decision thereon upon June 12, 1924.

The opinion which was written by Mr. Justice Richards and concurred in by all the members of the court reviews exhaustively the history of the creation of the special fund of the Fish and Game Commission and of the legislation relating to the use of said fund. It also reviews the several recent decisions of the Supreme Court interpreting and applying the provisions of the budget amendment and of the budget bill. It holds that section 680 of the Political Code has application to such cases of urgency as this and to the relief of self-supporting boards and commissions having special funds derived from fees, fines and collections and devoted to the particular activities of such boards and commissions. It is needless to say that the decision of the Supreme Court in this important case has given widespread satisfaction.—ROBERT D. DUKE.

COMMISSION WINS SUPREME COURT DECISION ON USE OF SARDINES IN REDUCTION PLANTS.

One of the most important decisions relating to the conservation of fish and game was rendered by the Supreme Court of California on June 5, 1924, in the case of *The People of the State of California* vs. *Stafford Packing Company*.

The Stafford Packing Company is engaged in the business of canning and packing sardines for human consumption and in connection with said plant operates a reduction plant for the manufacture of fish meal, fish oil and fertilizer.

The law permits any person engaged in the canning and packing of fish, upon application and hearing by the Board of Fish and Game Commissioners, to use in its reduction plant an amount of whole fish not to exceed twenty-five per cent of fish which any person, firm or corporation may can or pack or preserve for human food during a calendar month. Upon investigation it was found that the Stafford Packing Company was using about eighty per cent of sardines fit for canning, packing and preserving purposes in its reduction plant.

Upon request from the Fish and Game Commission, Attorney General Webb brought an action against said canning company seeking an injunction restraining said Stafford Packing Company from using sardines in its reduction plant in violation of law.

The case was heard before Hon. John M. York, Superior Judge of Los Angeles County, and in February, 1923, Judge York issued a temporary injunction against said Stafford Packing Company restraining said company from using more than twenty-five per cent of whole sardines fit for human consumption in its reduction plant during a calendar month.

An appeal was taken by Stafford Packing Company to the District Court of Appeal, Second District, and on the 30th day of December, 1923, the District Court of Appeal reversed the decision of Judge York. A petition for hearing before the Supreme Court was filed by the People and the same was granted; the case was argued before the Supreme Court and submitted, and the Supreme Court, on the 5th day of June, 1924, rendered a decision reversing the decision of the District Court of Appeal and affirming the decision of Judge York.

This decision holds that such an act on the part of the Stafford Packing Company constituted an "invasion of the property rights of the people, and having determined that the acts complained of constituted a wrongful invasion of those property rights and having further determined that the threatened continuance thereof would work irreparable injury for which there was no adequate remedy at law, there was a complete foundation for equitable interposition and equitable relief."

The able manner in which the case was presented by Attorney General U. S. Webb and Assistant Attorney General John S. Maltman is reflected in this decision.—ROBERT D. DUKE.

SAFETY OF SALMON NOT ASSURED BY BUILDING FISHWAYS.

California is not the only state disturbed over projected power dams which would destroy the run of salmon. A 90-foot dam is now proposed for the Columbia River and plans include a fishway. Those who do not know the facts might readily be convinced that the future of salmon will be safe because of such a fishway. However, fish experts know that salmon do not readily pass over a fishway as do trout. If promoters succeed, we may expect that a fish ladder useless for salmon will be built as a blind and the total destruction of the salmon run follow. If companies planning such dams can prove that salmon will successfully negotiate a fishway, and then proceed with the work, fish conservationists will be satisfied. Instead, they plan to go blindly ahead and build a fishway, planning to experiment after it is built and suggesting that improvements be depended upon to make the fishway effective. This should be opposed by everyone interested in the future of salmon. First, let such companies test out fishways on some existing dams and thus obtain definite proof as to whether salmon can be made to utilize a smaller side current of the type furnished in a fishway.

The salmon situation confronts California in the proposed dam on the Lower Klamath. When it can be shown that king salmon readily pass over such a fishway as that of the Estacada fishway on the Clackamas River in Oregon and that a much higher one would still be efficacious then will opposition be met and building of the dam be approved.

SUPREME COURT MAY DECIDE KLAMATH RIVER FIGHT.

A new angle was placed upon the fight to save the natural resources of the Klamath River on June 6 when the state Supreme Court granted a petition for a hearing of the case instituted in the superior court of Siskiyou County several months ago. A decision of the Third District Court of Appeal to the effect that the superior court of Siskiyou County had no jurisdiction in the matter resulted in an appeal being taken to the Supreme Court. The suit contests the right of the State Division of Water Rights to issue a permit to the company proposing to build a 250-foot dam on the Lower Klamath.

THE CONSERVATION OF THE KLAMATH RIVER.

Losses to Date.

Application made by the Electro-Metals Company to the Federal Power Commission for a permit to build a 250-foot dam at Ishi Pishi Falls, 80 miles from the mouth of the Klamath River.

April 27, 1924, State Division of Water Rights grants permits for 6000 cubic feet of water to the Electro-Metals Company and 9000 cubic feet to the Jackman interests.

Gains.

September 16, 1922, Federal Power Commission refers application back to State Division of Water Rights.

April, 1923, United States Bureau of Fisheries supports contention of California Fish and Game Commission that successful fishway over 200-foot dam is impossible and contention that successful operation be proved before dam is allowed to be built.

In Order to Win.

First: Eighty thousand voters to place initiative on ballot; and second: favorable vote by people of the state.

DRAINAGE OF LAKE EARL PREVENTED.

Concerted effort by conservationists has prevented the drainage of Lake Earl in Del Norte County. Sixteen of the landowners included in the district which was advertised, got together to fight the matter at the hearing. Furthermore, a petition was circulated among the sportsmen of the county by game warden, H. S. Prescott, protesting against the drainage of the lake on account of its value for scenery, hunting, fishing and recreation purposes. This petition was filed before the board of supervisors, as well as certain legal objections, both of which, together with the fact that the engineer employed by the other side failed to appear, so dampened the ardor of the drainers that they did not put up any fight. At the request of the anti-drainage forces, therefore, the board denied the application to form a reclamation district on the legal technicality that the petitioners had not made an adequate verbal showing of the sufficiency of the petition. In case the matter is brought up again, it will be difficult for the petitioners to get a majority of acreage because of the attitude of the landowners.—Frank B. Kellogg, Crescent City, Cal.

DEMAND FOR RESTORATION OF LOWER KLAMATH LAKE AS WILDFOWL BREEDING GROUNDS.

The value of Lower Klamath Lake as a great wild life nursery was recognized by President Roosevelt who, in 1908, set aside 22,400 acres in this area as a bird

reservation. This large, beautiful lake in eastern Siskiyou County, extending over the line into Oregon, occupied several square miles of territory and was surrounded by marsh lands, its edges fringed by extensive tule growth. Several fresh water streams entered the lake from the west and in these watered areas were many homesteads with fields of pastured cattle. For uncounted years this lake had been the breeding grounds for myriads of shore and water birds. Gulls, terns, herons, killdeer, white pelicans and black cormorants, Canada geese, and numerous ducks flocked here by the thousands to rest, feed and nest. With all hunting prohibited, the lake remained for several years, not only California's largest and best breeding grounds for wildfowl, but also one of the largest and best bird reservations in the United States.

FIG. 29. Lower Klamath Lake in May, 1924, from west side of lake looking east. Clouds of alkali dust and ashes are seen in the distance. This was once the home of countless waterfowl. Photograph by J. O. Miller.

Promoters, however, saw the possibility of draining this lake and selling the land for agriculture. In spite of the protests of those interested in preserving the lake as a bird refuge, officials of the Bureau of Biological Survey, and even the Commissioner of Reclamation himself, opposed to the project on the ground that "very little conclusive evidence can be found as to the agricultural value of the lands around Klamath Lake," a reclamation district was formed in 1917, and at a cost of $300,000 the lake was drained.

Now it is apparent to all—foes and former friends of drainage alike—that a big mistake was made. Instead of resulting in good agricultural lands, the lake bed is a dreary alkali waste, barren of natural growth or of crops, with the exception of two or three hundred acres of rye. In some places where tules abounded, the dried roots have been burned down to the hardpan leaving the rocks devoid of anything but ashes. One of these fires north of the Oregon line has been burning continuously for more than a year. All that is left now of the several square miles of lake, once teeming with life, is a few hundred acres in which the water is not more than two feet deep in any place and which, it is stated on good authority, will entirely dry up this summer. Here, in place of the millions of birds which formerly flocked to undisturbed feeding and nesting grounds, are a few hundred ducks and shore birds. The grasshopper outbreaks of 1922 and 1923, described elsewhere in these columns, were undoubtedly one of the results of the drainage of the lake and the consequent driving away of the birds. There is now little surface water and the once prosperous dry farmers have been forced to abandon their claims, leaving deserted cabins behind. Instead of the once beautiful lake, valuable for the millions of waterfowl which bred there, the fine trout it harbored and the fur-bearers which haunted its shores, there is left only a vast, uninviting, worthless waste, from which clouds of alkali dust can be seen rising with every gust of wind.

Fortunately, the reflooding of the lake is feasible because the water flowing into the lake was simply diverted into Link River. A strong sentiment is manifest among sportsmen, conservationists, and officials of government departments con-

cerned, for the restoration of the lake as a wildfowl breeding grounds. There is also an opportunity for friends of the undertaking to lend their aid. If you wish to help, write to Dr. T. Gilbert Pearson, president of the National Association of Audubon Societies, 1974 Broadway, New York City, or to Mr. Elwood Mead, Commissioner of Reclamation, Washington, D.C., expressing your desire to see the lake restored. Commissioner Mead, for several years Professor of Rural Institutions in the University of California, has expressed sympathetic interest in the movement and will welcome such expressions of opinion from Californians. If everyone will do his bit, undoubtedly some action will be taken.

KLAMATH LAKE BIRD RESERVATION PAST AND PRESENT.

The following letter by E. W. Nelson, chief of the Bureau of Biological Survey, sheds additional light on this great bird reservation as it was before drainage and by drawing contrasts, emphasizes the need for restoring the lake.

Washington, D. C.
June 11, 1924.

Hon. Elwood Mead,
Commissioner of Reclamation,
Department of the Interior.

Dear Dr. Mead: In accordance with our recent conversation regarding conditions at Klamath Lake, Oregon, I take pleasure in submitting the following statement reviewing briefly the history of Klamath Lake Bird Reservation and the changes which have occurred thereon since the closing of the gates at Ady:

The Klamath Lake Bird Reservation was established by Executive Order of August 8, 1908, and was modified by two subsequent Executive Orders, (1) May 14, 1915, considerably reducing the area on the east and west sides of the lake in California, and (2) March 28, 1921, eliminating 40.8 acres from the refuge in Oregon. The Klamath Project includes some 54,000 acres of land and water, approximately half of it in the State of California. The normal level of the water, according to the gauge located near Brownell, California, was about 4,086 feet during high water in March and April 1907, 1908, and 1909, and in May, 1907, increased slightly above 4,087 feet. According to the gauge located at Lairds Landing, the normal level of the water in May 1913-16 was 4,086 feet or a few inches below, and in May, 1917, almost reached 4,087 feet. In the autumn of 1917, the gates at Ady were closed, thereby shutting off the source of water supply from Klamath River and since that date the water level has receded until much of what was originally the lake has become an alkaline marsh with little, if any, water in two depressions in the southwestern part of the reservation. As the water evaporated and the lands dried out, much of the former lake bottoms became covered with a mass of weeds but little, if any, successful agricultural development has resulted from the drainage of the lake. In 1919, a serious tule fire in the southeastern part of the reservation burned over a considerable acreage, destroying the peat and leaving only an area of ashes. By 1920 the destruction of the reservation had proceeded so far that it was generally conceded that a mistake had been made in cutting off the water and lowering the water level to such an extent that the lake was converted into an alkali marsh. A public meeting was held at the Reclamation Service Office at Klamath Falls, Oregon, at which testimony was taken regarding the opening of the head gates at Ady for the purpose of allowing the lower lake to be refilled. Since then the matter has been agitated from time to time but, although it is obvious that this is the only way in which to restore the lands to their original condition and to put them in shape to produce the greatest return, no definite action has thus far been taken.

As an illustration of the contrast between the wild life existing shortly after the reservation was created and at the present time, it is only necessary to refer briefly to the reports of the wardens regarding the birds which formerly nested on the reservation. In July and August, 1912, four years after the creation of the reservation, L. Alva Lewis, Warden of the Biological Survey, reported among the birds breeding that summer some 1200 nests of Western Grebe, 2000 nests of California Gulls, 3500 nests of White Pelicans, 1000 nests of Mallard Ducks, 500 nests of Green-winged Teal; 1000 nests of Pin-tail Ducks, 200 nests of Red Heads, 250 nests of Canada Geese, and large colonies of Caspian Terns, Forster's Terns, Cormorants, Great Blue Herons, a considerable number of Avocets, Black-necked Stilts, Wilson's Snipe, and other marsh birds. Klamath Lake Reservation was then one of the greatest breeding places for water fowl in the West and contained one of the largest breeding colonies of White Pelicans and the southernmost breeding place of the Canada Goose on the Pacific Coast.

In 1920, only 8 years later and three years after the water had been cut off, the warden reported in August that the marshes surrounding the lower lake were well burned over and that a fire was burning in the dry peat soil which was covered with water prior to the time the water was shut off at Ady. As a result of the drying of the marsh and tule lands, much of the water in the low places had become so strongly alkaline that many of the ducks died as they had in the previous year probably from alkali poisoning. In 1921, still further diminution of ducks and geese was noted. In the spring of each year birds could be seen in considerable

numbers evidently trying to find some suitable place in which to nest but, as a result of the lowering of the water, the great colonies of gulls, cormorants, white pelicans and geese practically disappeared from Klamath Lake, the ducks were scattered, few, if any, nesting on the reservation, and what was formerly a great wild life refuge became a desert.

With the rapid development of the West and the numerous projects for drainage, many of them ill-advised, marsh lands suitable for nesting grounds of water fowl and wading birds are rapidly becoming more and more restricted. These areas are becoming more and more valuable every year not only as game refuges but in preserving fish and certain other forms of aquatic life and also certain kinds of fur-bearing animals, all of which may be made to produce a steady and increasing revenue in the form of game, fish, and fur as well as large cash returns through the money spent by visiting sportsmen. After an experience of seven years, the drainage experiment at Klamath Lake has proved not only a dismal failure as an agricultural project but has resulted in the destruction of the only natural resources which seemed to offer any permanent increase in values in this immediate region. By restoring the water to its former level and again covering the alkali marshes, the birds will return and in the course of a comparatively short time, it is hoped that the great colonies of breeding water fowl may be largely restored to the condition existing when the reservation was created. It may then be possible to proceed with the natural development of the reservation along lines which will make it not only one of the great breeding grounds for wild life in the West but one of the great attractions of this section of Oregon and California.

Sincerely yours,
(Signed) E. W. NELSON,
Chief of Bureau.

REACTION AGAINST DRAINAGE PROJECTS CONTINUES.

A recent editorial in *Forest and Stream* based on the statement of Professor Edward M. East reads: "There are some 60,000,000 acres of drainable swamps. It will mean much toil and a great capital outlay to drain these 60,000,000 acres; but it can and will be done as fast as necessity sets the machinery in motion." There follows several arguments against drainage operations: the lowering of the water table; temporary bumper crops with resultant burnt-out land and the despoiling of the very sort of land which older countries find has furnished a better food supply and larger income than that to be secured from upland.

We agree that there should be conservation of marsh lands as well as conservation of other natural resources for such lands alone will grow crops of fish, fur-bearers, waterfowl and certain valuable crops.

"ACT IN HASTE AND REPENT AT LEISURE."

How aptly the old adage, "Act in haste and repent at leisure," describes the policy followed when it comes to natural resources. We destroy timber, fish and game, and water resources and then complain of the result when emphasis should have been placed on "foresight." Wakefield Dort, in a recent article emphasizing foresight, suggests:

We believe that before any tract of land is drained the following questions should be answered:

1. Is the area a natural feeding place for wildfowl and a hunting ground where people from the neighboring communities gather each year a valuable harvest in the way of meat?
2. Is it a reservoir for the nation's game in the shape of a natural nesting ground where each year young wildfowl are raised and from which they scatter all over the country?
3. Is it a source of fish supply?
4. Does it yield an annual cash return from furs of muskrats, skunks, raccoon, mink, etc.?
5. Is it a natural source of ice supply?
6. Does it help maintain the subsoil water level which is essential to the production of all crops and forest growth?
7. Will the drainage of the area seriously affect the water supply in lakes, springs and wells in adjacent areas?
8. Is the marsh very valuable in holding back the run-off of flood waters and in that way preventing excessive erosion and other flood damage?
9. Does it produce grass valuable for forage and for the manufacture of grass rugs which has become a profitable industry; does it produce willow suitable for basket making and other purposes?
10. Is it valuable as a playground for people from the surrounding country? (Its value in this respect can not be computed in dollars and cents but it is nevertheless of tremendous importance.)—*The Wake of Destruction, The Sporting Goods Dealer, December, 1923.*

DEER CONTRACT FOOT AND MOUTH DISEASE.

Dr. Rudolph Snyder, of the Bureau of Animal Industry, in charge of Foot and Mouth Disease Campaign, State Headquarters, Oakland, says that evidence indicates the practical immunity of deer to foot and mouth disease. At least some of the few deer killed during the 1914-15 epidemic, he reports, were found to be wholly free of the disease, and he has no positive information that any deer has ever become infected in the United States. In British India it has been found that the susceptibility of deer to the foot and

mouth disease is comparatively low, and is comparable to that of sheep and goats rather than to that of cows and hogs.

Such was the belief of officials relative to the foot and mouth disease in deer up to July 12, 1924, when a deer found dead at the head of Mill Creek, in the Stanislaus National Forest, showed conclusive evidence of the disease. Since, it has been well established that deer are not only subject to the disease but that the disease is prevalent among deer in one locality in Tuolumne County, thus constituting a serious problem in the future control of the disease. In the one area concerned officials are on the ground and are handling the situation in the best manner possible.

"FUNDAMENTAL PROBLEMS OF GAME CONSERVATION."

The Executive Committee of the Boone and Crockett Club published a very interesting report with the above title in the February number of *Outdoor America.* This is so important a statement that we feel compelled to call some of the points to the attention of our readers.

After a review of the history of game conservation in the United States, the report advocates game administration as the most needed measure. Game administration is defined as "plain common sense management so as to insure a permanent breeding stock which will perpetually produce a given surplus to be used as completely as possible for all three purposes of game conservation." These three cardinal purposes are enumerated as: aesthetic pleasure, economic use, and recreational use for sport, study and photography.

The main recommendation is to be seen in the statement that "all wild life in the national forests should be administered unconditionally by the Forest Service." The report admits that federal legislation can not take away the state's right in the game of the forests and that such administration is impossible except by developing sufficient public sentiment to insure each state delegating this power to the federal government.

Suggestions as to how states can best administer their game are: The "appointing of nonpartisan, expert game commissions with long tenure of office and full authority independently and unconditionally to administer the game;" and the applying of "all known methods of game regulation and preservation in any part of or throughout the state."

"It is common sense to believe that a game commission thus made fully responsible for its acts, would be less likely to act with indifference, neglect, or with careless thought of the probable results."

The report closes with a plea for the substitution of the words "game administration" for "game protection" and for the administration of game from a supremely practical point of view rather than from a sentimental one.

WASHINGTON BECOMES WORRIED ABOUT DAMS.

May 1, 1924.

California Fish Commission,
Postal Telegraph Building,
San Francisco, California.

Gentlemen:

The rapid development of the demand for hydro-power has led to a great increase in the number of projects for which permits have either been applied for or are in process of preparation. As the state of Washington has probably the greatest undeveloped hydro-power resources of any of the western states, it is not surprising to note that efforts are under way to lay most of our streams under contribution. While this is gratifying from one standpoint, it is proving a source of danger from another.

The Pacific coast states, British Columbia, and Alaska, are blessed with large annual runs of anadromous fishes, i. e. fishes that live normally in salt water but are compelled to come into our rivers for reproductive purposes, these comprising our salmons, certain of our trouts, the smelts, eulachon, sturgeon, shad, and others. In addition, certain of our trouts, the whitefish, suckers, and others make regular migrations up and down stream, which they usually perform one or more times a year. These anadromous species appear annually off the mouths of the streams in enormous numbers, and in the lower reaches of same, and off their mouths, immensely valuable fisheries have been prosecuted for many years for them by both whites and natives, thus furnishing employment to thousands of people each year, while other thousands are employed in the various canneries and other preservation plants.

Each river has its own distinct runs of anadromous fishes, and in the case of the salmons and steelhead trout, the fish is content only with the stream in which it is born or in which it spent the early months of its life. As a result of this, should an artificial obstruction of a height that the fish can not jump over be placed across a stream it is necessary to install a fishway or artificial ladder by which the fish is aided in getting over the dam. This has already been done in a number of instances, and in the case of dams of moderate height, say not over 30 feet, has been fairly successful. Most of the new projects, however, call for dams of much greater height, some to be 200 or more feet.

With the methods now in vogue for getting fish over dams it is questionable

whether a fishway could be installed and successfully operated in dams over 30 feet in height, but it is possible that more extensive research by biologists and engineers in collaboration, which has not been done heretofore to any considerable extent, might solve the immediate problems, a summary of which follows:

(1) To get the adult fish up to their desired spawning ground.

(2) To get the adult trout and other fish over the dam in their migrations up and down the stream. The salmon all die after spawning and thus present no down stream problem.

(3) To get the young salmon and trout safely down the stream and to their natural home in salt water.

(a) Either over the dam or through the turbine.

(b) Prevent their entering the irrigation ditches.

Unless the problems noted above are solved, we must either sacrifice our immensely valuable river fisheries, or else prevent the building of dams and other obstructions in rivers frequented by these fish, thus forcing the hydro-power development into those sections or the rivers above where the fish spawn. We feel sure that both interests involved would regard this as far from desirable and would welcome the devising of means by which the two could exist side by side without injury or unnecessary hardship to either.

The University of Washington is interested in the fullest possible development of our natural resources, consistent with their perpetuation, and with this end in view takes pleasure in inviting you to attend a conference of the hydro-power and fishery interests, the state department of fisheries concerned, and representatives of our fisheries and engineering faculties, to be held in the assembly room of the Seattle Chamber of Commerce, in Seattle May 14, beginning at 2:00 p.m., and trust you will find it convenient to be present.

Respectfully,

JOHN N. COBB,
Director.

(Acting in this matter for Dr. Henry Suzzalo, president, during his absence.)

CONFERENCE RESULTS.

A conference of great interest to all who are interested in the perpetuation of our Pacific Coast annual runs of anadromous fishes, i. e., salmon, steelhead trout, shad, smelt, etc., was held in Seattle, Wash., on the afternoon of May 14, the same having been called by Prof. John N. Cobb, Director of the College of Fisheries, of the University of Washington, for the purpose of bringing together those interested in the welfare of our fisheries and the representatives of the more important water-power interests who are seeking, or now have, locations on the rivers of Washington and Oregon.

The United States Geological Survey has recently issued an estimate of the potential water power resources of the United States, and has placed the state of Washington first, with 7,871,000 horsepower. In the estimate, Washington is closely pressed by Oregon, California and New York, and this shows clearly the immense importance of this matter to the Pacific coast states.

In the effort to develop water power resources, or to obtain possession of choice sites for same, filings have been made on many streams in the Pacific coast states, and efforts are now under way to obtain licenses for the construction of the necessary dams, etc., either from the federal or state authorities, depending upon the kind of stream to be dammed, whether navigable or not, and whether federal property is involved. This has been especially true in Washington, one of the most ambitious being the Priest Rapids project on the Columbia River.

Priest Rapids is located about midway of the Columbia River, and the projectors plan the construction of a dam about 1⅔ miles in length for the purpose of generating an enormous amount of power which they hope to sell to industries they expect to be attracted by cheap power.

The damage an obstruction at this point could do to the very valuable food and game fishes of the Columbia River, should no provision be made for getting the salmon and trout over it, on their way to their usual spawning ground, and the young fish back down it when on their way to the sea, is patent when we state that about two-thirds of the frequented spawning area is above Priest Rapids.

Several months ago the projectors of the Priest Rapids enterprise made formal application to the Federal Power Commission for license to begin operations, and at a formal hearing held several months ago before the U. S. Army Engineer, J. W. Barden, in charge of that district, the fishery interests of the states of Washington and Oregon entered verbal objections to the granting of this request, and a little later filed a voluminous printed brief. As the company later asked for a conference with the protestants this was fixed for the morning of May 14, and about the same people attended as were present at the more important afternoon meeting, for which this was merely a prelude. The company offered to do everything possible to safeguard the migrating fish, and finally a committee, to be composed of representatives of the Oregon and Washington departments of fisheries, a representative of the fishery interests, and Prof. John N. Cobb, Director of the College of Fisheries, University of Washington, was

appointed to pass upon plans submitted for the solving of the problem, the understanding being that no permit was to be granted for the work until a satisfactory solution had been found, and tried out on some existing dam.

The proposed Priest Rapids project, and another to dam Baker River, a tributary of the Skagit River, which debouches into Puget Sound, and which stream has the only Puget Sound run of Sockeye salmon, showed clearly the imminent danger confronting the fishing industry, and in the belief that the threatened appropriation of our streams for irrigation and power purposes without adequate safeguards for the migrating salmon was due largely to a failure of the conflicting interests to get together in an effort to seek a solution satisfactory to both, Director Cobb decided to move in the matter and great credit is due him for his initiative.

When the meeting was called to order there were some 35 persons present, as follows: Dr. T. W. Ross, F. W. Kendall, and Carl Shoemaker, of the Oregon Fish Commission; Capt. A. E. Burghduff, of the Oregon Game Commission; E. A. Sims and Capt. Harry Ramwell, of the Washington Fisheries Board; Ernest Seaborg, State Supervisor of Food Fishes, Seattle; J. Warren Kinney, State Supervisor of Game and Game Fishes, Seattle; Dan Campbell, of Bellingham, president, and Dr. E. D. Clark, of Seattle, secretary, of the Association of Pacific Fisheries; George W. Sanborn and Fred Barker, cannerymen, of Astoria, Oregon; Miller Freeman, Publisher, and Stedman H. Gray, Editor, *Pacific Fisherman*, Seattle; Charles Garfield, Seattle Chamber of Commerce; O. B. Coldwell, vice president, Portland Electric Power Company, Portland; J. E. Yates, engineer, Pacific Power and Light Company, Portland; O. L. Le Fever, general superintendent, northwestern Electric Company, Portland; V. H. Greisser, chief engineer, The Washington Water Power Company, Spokane; W. D. Shannon, Chief Engineer, Puget Sound Power and Light Company, Seattle; C. E. Magnusson, Dean of the College of Engineering, University of Washington, and John N. Cobb, Director of the College of Fisheries, University of Washington.

In a most amicable spirit, a full and frank discussion was had and soon it was clear to even the most obtuse that important and exhaustive investigations would have to be made in the search for a satisfactory solution, with the possibility that even after the work was done failure might be the result. It was also plainly evident that this work would require considerable money, and the water-power people agreed that as the problems would rebound almost wholly to their benefit, that they would bear the bulk of this burden, and also agreed to loan the services when required, of their engineering staffs, on which are to be found some of the most talented engineers in the world, and for this purpose the following committee of engineers was appointed to act with the committee of fishery experts appointed at the morning conference to pass upon the Priest Rapids project:

O. B. Coldwell, vice president, Portland Electric Power Company, Portland, Oregon, chairman;

J. E. Yates engineer, Pacific Power and Light Company, Portland, Oregon;

O. L. LeFever, general superintendent, Northwestern Electric Company, Portland, Oregon;

V. H. Greisser, chief engineer, The Washington Water Power Company, Spokane, Washington;

W. D. Shannon, Puget Sound Power and Light Company, Seattle, Washington.

POSTPONEMENT OF ANGLING SEASON DEMANDED.

Owing to the epidemic of foot and mouth disease this past spring, there was urgent demand made by officials in charge of quarantine measures that the opening of the trout season be postponed in order that quarantine might be more successfully enforced. A visit to any of the infected areas would have shown that this was a reasonable demand. The disease can be controlled only through very strict quarantine. Fishermen do not always stay on well-traveled routes where quarantine officers might intercept them, thus adding danger of entering infected areas unknown to quarantine officers.

To these demands the Commission was forced to reply that, even in such an emergency as this, the Commission is helpless in that no plenary powers have been delegated to it by the legislature. No law can be changed at the pleasure of the Commission, no matter how reasonable it seems or how generally it may be demanded. Several attempts have been made to secure properly safeguarded discretionary powers, but each time the Commission has been rebuffed. Could discretionary powers be obtained, such emergencies could be properly handled. Legislation could be suited to the requirements of localities rather than of whole districts. Increased protection could be immediately afforded fish and game whenever unusual circumstances warranted and, in many cases, increasing complication of fish and game laws could be remedied.

Let it be clearly understood that under the present system, the hands of the Fish

and Game Commission are tied and this body is powerless to give fish and game added protection in time of emergency or to cope with situations such as that presented by some epidemic. Unquestionably, the most needed game law at the present time is one which will remedy this situation.

ONLY LEGISLATURE COULD HAVE CHANGED TROUT SEASON.

Rumors were rife during the spring relative to the opening of the angling season. Several boards of supervisors attempted to take the matter into their own hands and passed ordinances postponing the opening of the trout season or closing it entirely. The State Board of Agriculture unwittingly sent out a notice to the effect that all fishing was prohibited in the county of San Francisco and surrounding counties, failing to remember that it was here that much commercial fishing was carried on and yet no stipulation regarding this industry was included. Unfortunately, no general policy was decided upon and there was resultant confusion. Finally, the general policy of emphasizing quarantine rather than that of discriminatory legislation against fishermen was adopted. Quarantine measures hit everyone alike and are legal and enforceable. Had this policy been decided upon earlier, there would have been less unfavorable comment and better respect for quarantine measures.

The desire to cooperate in every way for the eradication of the disease is indicated in the following letter issued by the Commission:

In view of the serious situation affecting the livestock and allied interests in the state by the foot and mouth disease, and in order to assist in eradicating the disease, the anglers of the state should assist both the state and federal government in abiding by the police regulations established by these authorities in the infected districts and adjoining counties.

A proclamation is, or will be, issued by the State Department of Agriculture requesting boards of supervisors of the counties infected and buffer counties thereof, placing a quarantine on those counties.

Deputies of the Fish and Game Commission are requested to lend every assistance in promoting the observance of the spirit of the proclamation.

FISH AND GAME COMMISSION.

FIG. 30. Yosemite's record trout, weight 9 pounds 15 ounces; length 28½ inches, caught by U. N. Gilbo, June 5, 1924, seven miles down the Merced Canyon from Yosemite. Photograph by H. C. Bryant.

DRY YEARS EMPHASIZE NEED FOR DISCRETIONARY POWERS.

The past spring saw trying conditions for trout. Many of the coastal streams contained so little water during the spawning season that steelhead trout were unable to enter the streams at all or, if they were able to pass the sand bar at the mouth, they soon lost their lives owing to low water, which means poor food supply and poor aeration.

It seems reasonable that when the natural death rate is great, the toll taken by the angler or hunter should be reduced accordingly. Under the present system this is impossible for, at just the time

when it is most necessary to curtail angling or hunting because of unusual conditions, the Fish and Game Commission finds itself powerless to act. According to law, all regulations concerning season limits, closing of streams, and hunting areas is left to the legislature which meets every two years. As a consequence, all regulations must hold for at least two years and any opportunity to vary the regulations according to need is impossible. The California Fish and Game Commission has no discretionary powers. Criticism of the commission for not more satisfactorily handling the situation presented by a dry year is undeserved and is like striking a man who is bound hand and foot.

CROW AND HAWK PRIZE CONTESTS.

In continuance of the organized scheme to promote the shooting of crows, the Dupont Powder Company announces an international crow shooting contest with 79 individual prizes and 210 team prizes, worth $2,500. The eye catches such statements as: "It is always open season on vermin;" "Hunt these pests now;" "It means full game bags next fall;" and "Less vermin means more game." Although called a crow shooting contest, the vermin list is a long one, including: snapping turtle, great horned owl, snowy owl, weasel, hedgehog, starling, sharp-shinned hawk, Cooper hawk, kingfisher, woodchuck, hunting house cat, bob-cat, red squirrel, water snake, crow blackbird, goshawk, field rat and gopher. The killing of any of the hawks enumerated, or of the great horned owl, gives the shooter five points, as against one point for killing a crow. Yet emphasis is on *crow* shooting!

If we could be assured that all those entering this contest and seeking these prizes knew the difference between a Cooper hawk and a red-tailed hawk, we would not feel so concerned. We are sure, however, that many of the birds presented for points will be beneficial rather than injurious hawks. The same can be said of owls.

Still more disconcerting is the time set for the contest—March 15 to June 15. This is the time of all times when no guns should be fired and when all bird and animal life should be given safety and quiet for the rearing of their young. Talk to any game warden and he will tell you that the main hope of satisfactorily enforcing game laws is to be found in limiting the season when men may go afield with a gun, so that a man hunting out of season is easily apprehended because in possession of a gun. Many conservationists have been working toward this very end in hope that such increased advantages to the game protector might be forthcoming. Now comes discouragement from many who call themselves conservationists, and an organized campaign by a powder company with strong financial backing and with well laid plans to send boys and men into the field right during the breeding season of game. Will not the quail suffer more as a result of disturbance and consequent desertion of nests than they would have from the presence of the quail-eating hawks which may be secured by those entered in the crow shooting contest. We have recently stopped one kind of spring shooting and now we find tolerance given to another kind masquerading under false colors. Do you not see in this "a wolf in sheep's clothing!"

ARMS COMPANIES ADOPT DANGEROUS POLICY.

In the last number of CALIFORNIA FISH AND GAME two editorials were devoted to crow shoots and the present tendency to advocate killing of crows and hawks by arms companies during the closed season on game. Another company, apparently in order to sell more guns and ammunition, advertises, "Pick off the pests." The "pests" to be gotten rid of include, "weasels, bob-cats, crows, hawks, gophers, rats, skunks and great horned owls." Here, again, we find the violation of the closed season advocated thus: "Pests destroyed in spring means better shooting in fall." Pictures of four of the black-listed predators accompany the advertisement. Especially misleading is the one showing a hawk attempting to catch young quail which only bears the designation "hawk," rather than naming one of the injurious bird hawks.

For years, conservationsists have been attempting to educate people to the difference between good and bad hawks and it is no wonder that these same conservationists are indignant at the wholesale breaking down of their teachings as a result of widespread paid advertising by arms companies. These same companies make a great pretense at lining up in support of all conservation measures but here is certainly one place where they are falling far behind.

BAND-TAILED PIGEONS DESTRUCTIVE TO CHERRIES.

During April the Fish and Game Commission was besieged with complaints by owners of cherry orchards of depredations by band-tailed pigeons. In several instances deputies of the commission were furnished with black powder cartridges

and successfully demonstrated to owners that orchards could be protected and birds frightened away by using black powder.

We can all be thankful that band-tailed pigeons have so successfully reestablished themselves that depredations are becoming more common. A few years ago there were so few of these birds that it was seldom that reports of this kind were heard.

HEARING ON THE MIGRATORY BIRD REFUGE ACT.

On March 29, 1924, the Committee on Agriculture of the House of Representatives held a hearing on the "Bill for the establishment of migratory bird refuges to furnish in perpetuity homes for migratory birds, the establishment of public shooting grounds to preserve the American system of free shooting, the provision of funds for establishing such areas, and the furnishing of adequate protection for migratory birds, and for other purposes."

The only direct opposition which appeared came in the form of letters filed by Representative Colton of Utah, one written by D. H. Madsen, State Fish and Game Commissioner, and another by V. H. Tingey, secretary of the Box Elder Fish and Game Protective Association of Brigham City, Utah. The main points brought out by Commissioner Madsen were the duplication of effort which will result in the creation of a government machine to do work now being satisfactorily done by state commissions and the small return that each individual state may expect in refuges and public shooting grounds on the basis of 45 per cent of the license fees paid in each state. Two members of the Committee of Agriculture expressed opposition to the license system and doubts as to the satisfactory working out of the law. These were Aswell of Louisiana and Johnson of West Virginia.

Speakers in favor of the bill included: R. P. Holland of the American Game Protective Association; E. W. Nelson, chief of the U. S. Biological Survey; A. C. Baxter of the League of Ohio Sportsmen; Hon. W. H. Albert, State Fish and Game Commissioner of Iowa; Hon. Carlos Avery, former Fish and Game Commissioner of Minnesota; F. C. Calkins of Jacksonville, Florida; C. P. Williams, Fish and Game Commissioner of Tennessee; W. S. Downs of the Middle Atlantic Fisheries Association; Wm. C. Adams, Director of Fisheries and Game of the State of Massachusetts, and a number of others, concluding with a brief by Karl T. Frederick, representing the Camp Fire Club of America, on the constitutionality of the proposed bill.

SUISUN LANDS MADE ATTRACTIVE FOR WATERFOWL.

It is encouraging to find that occasionally there is reaction from the steady march of that type of reclamation which is destructive to breeding grounds for waterfowl. In years past, most of the land in the surrounding Suisun Bay has been sold for agricultural purposes and has been subsequently drained. In most instances the land has been utilized for the growing of grain, garden truck, or for dairy purposes. Agricultural operations not being successful, much of this same land is now being sold to be used only as shooting grounds. Whereas, agricultural land sold at $150 per acre, some of this same land is now selling for $80 per acre for use as waterfowl shooting grounds.

Last year saw at least 7000 acres of land formerly used for agriculture flooded and made attractive to ducks. Another year will see about 10,000 acres more treated the same way. Flooding such lands makes very attractive feeding ground to ducks because of weed seeds. Pintails, particularly, are attracted to the shallow water afforded in these areas. As a consequence of these operations there has been some change in the kind and number of waterfowl. Whereas, the original marshes were attractive to mallards, widgeon and teal, the present flooded fields largely attract pintails, which have come in enormous numbers to these grounds, making limit bags the rule.

In these days of continual usurpation of breeding grounds and feeding grounds of our game birds, it is pleasing to be able to note even a slight return to more favorable conditions for these birds.

HUNTING FROM AIRPLANES CONTINUES.

The practice of hunting and killing migratory waterfowl from airplanes continues to some extent, according to a recent statement of the Biological Survey. Wherever violations of this kind are reported, however, every effort is being made to apprehend and convict the person responsible for the illegal act. Sixteen cases involving hunting of migratory waterfowl from airplanes have been obtained since the migratory bird treaty act regulations became effective.—The Official Record, U. S. D. A., Vol. III, No. 8, Feb. 20, 1924; p. 3.

IDEALS AND PURPOSES OF THE IZAAK WALTON LEAGUE OF AMERICA.

1. The practice of true sportsmanship in hunting and fishing, and strenuous and

unremitting opposition to illegal, destructive and unfair methods.

2. An aggressive program calling for national and state legislation to eradicate pollution from coastal and inland waters.

3. The broadest and most comprehensive system of federal control feasible over the forests of the United States and dependencies, this system to embrace the best features of the forestry policies of Europe so far as applicable to our conditions.

4. Due consideration of the disastrous results of indiscriminate drainage projects and the obstruction of natural water courses.

5. That adequate public shooting and fishing grounds and game refuges be established by the state and national governments.

6. Sufficient fish hatcheries and game farms for the increased propagation and wider distribution of fish and game.

7. Prohibition of the sale and interstate shipment of game and of fresh water game fishes excepting for purposes of propagation.

8. Scientific regulation of the taking of salt water game fishes and prohibition of the sale of certain anadromous species.

9. The strictest enforcement of the migratory bird law.

10. The establishment of a sufficient number of biological experiment stations so that scientifically trained men may always be available to pass upon the conditions of waters, wild lands, public shooting grounds and preserves in order to determine the proper species of fish and game to be planted therein.

11. The united support of those public officials, regardless of their party affiliations, who show themselves to be in sympathy with the principles of true conservation.

12. The fullest measure of cooperation between all organizations devoted to the interests of the outdoorsmen of America.

13. An unceasing, aggressive, educational campaign to the end that the objects of the Izaak Walton League of America may be attained.

WE PLEDGE OURSELVES TO DO OUR BEST TO RESTORE FOR POSTERITY THE OUTDOOR AMERICA OF OUR ANCESTORS.

FIG. 31. A remarkable photograph of a three-pound rainbow trout leaping a waterfall near Downieville. Photograph by Joe Lavazola, April 1, 1924.

"THE CHILDREN ASK US."

Wondering children, in a rural school at Brandon, Wis., ask a question:

"The heritage of our grandfathers was the buffalo and wild pigeon; the heritage of our fathers is the goose and duck, the muskrat and the mink. If the animals of today are not protected and provided for, what shall be left for us?"

In the names of the mothers and fathers of these United States we answer that question:

"Nothing shall be left for you. We will dig our drainage ditches through your marshlands and swamps and drive before us your waterfowl and your hyla. Our fires shall sweep over your woodlands, searing the last of your song birds and scorching out the dens of your foxes

and your wolves. We will cut the fringes of your timber, far in the northland, starving your moose and your elk. As we denude your land we will bake dry your pools and your lakes, your rivers and brooks.

"Your heritage shall be desolation—a land swept clear of sheltering trees. As in distant China, floods shall come down upon you, killing you by thousands, scattering your bodies over a parched countryside. Your agriculture shall be a combat with insect hordes and, at the last, they will strip you bare—for, without birds there can be no agriculture and we shall kill your birds. These things shall be your heritage. But with them we will give you steel and bricks and stone—man-made things on a land desecrated in the name of civilization and progress.

"Thus are we dealing with your patrimony and, in the name of prosperity and profit, we promise you these—you, who are our children!"—An editorial from the *Milwaukee Journal*.

NEVADA INTRODUCES KANSAS COTTONTAILS.

In an attempt to improve game conditions in Nevada large numbers of Kansas cottontail rabbits are to be imported. We decry the "melting pot" so far as humans are concerned. What shall we say about the mixture of faunas as a result of the endless attempts to introduce something from somewhere else?

TO PROTECT SALMON AND HALIBUT.

President Coolidge on June 6, 1924, signed the bill to establish fishing reserves in Alaska and to effect other measures to conserve the salmon fisheries of the Territory. Halibut fishing in the North Pacific Ocean is to be prohibited each year between November 16th and February 15th, inclusive. In order to protect the spawning season of this fish in the territorial waters of Canada and the United States, as designed by treaty.

FEBRUARY NETS LARGE CATCH OF SARDINES.

The fish catch for the month of February at Los Angeles Harbor broke all previous monthly records, both for the total tonnage of fish caught and the amount of sardines canned, according to C. S. Bauder, Deputy Fish and Game Commissioner. The total catch for the month was 23,040,926 pounds. Of that amount, 21,863,233 pounds were sardines. The highest previous catch in one month was 9,887,508 pounds, and the largest sardine catch was 8,451,776 pounds.

CALIFORNIA GREATEST OF FISH-PRODUCING STATES.

The fisheries of California produced slightly more than 223,000,000 pounds of fish and approximately 6,750,000 pounds of crustaceans and mollusks during the year 1923. This exceeded the 1922 catch by more than 59,000,000 pounds. The largest catch yet recorded was that for 1919 when 250,462,000 pounds were taken. Of the twenty-five commercially important varieties, sardines were taken in greatest number, the catch in 1923 reaching 158,159,356 pounds. The albacore (long fin tuna) ranks second in importance with 12,488,199 pounds; the salmon third with 7,090,260 pounds; barracuda fourth with 5,135,824 pounds; and skipjack fifth with 4,579,077 pounds. Sardines were sold by the fishermen for $10 to $12 per ton whereas albacore brought as high as $300 per ton.

Approximately four-fifths of the fish caught annually go to the canneries for preservation. Thirty-four concerns are engaged in canning fish and about thirty-seven other establishments salt, smoke or otherwise preserve fish. Both the number of licensed fishermen and of persons employed in canneries exceeds 5000. About one-fifth of the total goes to the fresh fish markets. The total investment concerned in the fishing business probably amounts to $10,000,000 in addition to $6,000,000 invested in canning and packing plants.

Several million pounds of fish and fishery products were imported from Mexico and the northwest in addition to the total shown for the State of California.

A CORRECTION.

We call attention to the report which appeared in the April number under the heading of "Arrests and Convictions," July 1 to December 31, 1923. This was a report sent in by Mr. Stuart W. Flintham, county forester and game warden of Los Angeles County and covers arrests and convictions for that county only. Los Angeles County appears to be one county in the state where state fish and game laws are strictly enforced by county wardens with resultant fines and convictions. If each county would aid in an equally efficient manner, better law enforcement would be the result.

MOUNTAIN SHEEP RANGES POSTED.

Believing that posted signs and an offered reward for information as to poachers would aid in protecting mountain sheep in California, signs with the following inscription have been placed through-

out the areas where mountain sheep are found. The expense of these signs has been borne by the Permanent Wild Life Protection Fund and the California Academy of Sciences.

REWARD

FIFTY DOLLARS

WILL BE PAID FOR INFORMATION WHICH WILL LEAD TO ARREST AND CONVICTION OF ANY PERSON SHOOTING OR MOLESTING MOUNTAIN SHEEP.

California Fish and Game Commission

Permanent Wild Life Protection Fund New York

California Academy of Sciences San Francisco

RECREATION NEEDS.

At last the federal government is awaking to the recreation needs of her citizens. As evidence, we offer the following statement of President Coolidge. A splendid outline for the National Conference on Outdoor Recreation which took place on May 22, 23, and 24 in Washington, D. C., was the result, with the conseqoent beginning of a real national policy on outdoor recreation:

"Particularly within the last decade, the outdoor recreation spirit among our people has increased rapidly. During this period there have been put forward projects—federal, municipal, state and private—to expand and conserve throughout the country our recreational opportunities. It is almost idle to emphasize their value to the country. The physical vigor, moral strength, and clean simplicity of mind of the American people can be immeasurably furthered by the properly developed opportunities for the life in the open, afforded by our forests, mountains, and waterways. Life in the open is a great character builder. From such life much of the American spirit of freedom springs. Furthering the opportunities of all for such life ranks in the general class with education.

"Our aim in this country must be to try to put the chance for out-of-door pleasure, with all that it means, within the grasp of the rank and file of our people; the poor man as well as the rich man. Country recreation for as many of our people as possible should be our objective.

"Though all are concerned in this matter, the lead must be and should be taken by the national government. Our national government is already concerned in many phases of it, but in an incoherent manner. In the administration of national parks, national forests, wildlife reserves, and unreserved domain, the government holds almost unlimited opportunities for this form of public service. The function of the federal government in the construction of highways, in the study of the propagation and protection of game animals, birds and fish, has a very decided bearing upon the recreational facilities open to our people.

"At present outdoor recreation is fostered by state, municipal and private agencies and federal bureaus — the National Park Service, the Forest Service, the Biological Survey, the Bureaus of Fisheries, Plants, Public Roads, and others. There are state parks in many of the states, state roads, state conservation commissions, and other like agencies. There are also many civilian organizations that impinge on this question, for example, the various sportsmen's associations, containing hundreds of thousands of members and, spread through every state, the camp associations, the boy and girl scouts, the conservation groups, and thousands of others. In order to handle this matter properly, to adjust the widely separated viewpoints and interlock the interests concerned efficiently, there should be a definite and clearly prescribed national policy. The whole matter, being nation-wide in its scope, demands such handling. The object to be secured should therefore be to promulgate a national policy which should not merely coordinate under federal guidance all activities in behalf of outdoor recreation, but also formulate a program to serve as a guide for future action.

"I am asking, therefore, Secretary Weeks, Secretary Work, Secretary Wallace, Secretary Hoover and Assistant Secretary Theodore Roosevelt to form a committee and to suggest to me how they think such a national policy can best be formulated and put into action."

CLEVER ADVERTISING.

Even a school of business may utilize everyone's innate love of fishing in advertising as is seen in the following:

"The sporting houses are just beginning to boom, and in a few weeks all the old fishing rods and a lot of new ones will be hanging over dark pools and swishy riffles.

"Then the trout stories will be on—big trout stories, long trout stories, wonderful 'fish' stories.

"Some of them will be real ones—the experienced fisherman always gets results; the big ones don't get away, and the bait seems to have the habit of making the fish hungry. While we of the luckless variety, with a two weeks experience every summer, stick to our hopes like a fly in the syrup, and feed the fish everything from automobiles to corncob pipes, we never seem to do anything but lose 'gobs' of spinners, flies, and patience. And the lucky strikes—yes, they do come once in a great while.

"Some people make lucky strikes even in business; one person in several million will occasionally hit on an oil well, but the results in the aggregate come through training.

"If you finish high school, says Professor A. N. Farmer in an address based in Government Statistics, you will add $20,000 to your life income, and if you go to college, you will add $68,000.

"Results in business, like results in fishing, come occasionally through luck, but as a lifetime proposition, it is the practical knowledge which wins."

ANTELOPE PROTECTION.

Of the probable millions of antelope which formerly roamed the western plains but 22,000 are left scattered through sixteen states. The average bands now range from three to a dozen animals and these small herds are not receiving the protection they should. A recent move for better protection by the government is an attempt being made to establish an antelope reservation in Western Oregon, the National Association of Audubon Societies taking a leading part in the endeavor. Little progress has been made, however, owing to protests from sheep herders of the vicinity. Little difficulty was experienced in obtaining favorable action by the majority of range men, but with commercial enterprises taking an active stand against the plan, victory may be far in the future. Success is now to be expected only after a long and arduous educational endeavor.

ILLEGAL TO TAKE FAWNS.

With the approach of the vacation season, it is necessary to emphasize again the need for leaving fawns where they are found. Unfortunately, vacationists have a bad habit of taking fawns into camp and attempting to rear them by hand. In applying for permits, they invariably state that "the poor little fawn was starving and had been deserted by its mother." In reality the mother undoubtedly saw the person carry off the fawn. It should be understood that fawns are left by themselves during most of the day but the mother is always close at hand, although unseen by an intruder. Fawns always look emaciated and sick, as if half-starved, and yet they always gain strength quickly and before long they are following their mother.

When a deer has once been kept a captive, it is dangerous to give it its freedom because of its tameness. From every point of view it is undesirable to touch fawns when they are found. If you will go away and leave them, they will be properly cared for.

PREDATORY ANIMALS POISONED IN TRINITY GAME REFUGE.

A fine chance to determine the actual effect of predatory animals on game is to be afforded as a result of intensive poisoning operations on the Trinity Game Refuge (1-D). Reports are to the effect that the poisoning has been so effective that no sign of either bob-cats or coyotes is to be found.

ANIMAL LIFE IN THE YOSEMITE.*

A newly published volume entitled, "Animal Life in the Yosemite," discusses all vertebrates of the Yosemite region, with the exception of fish, and, therefore, is the fullest account of the vertebrate life ever written on any national park. Reference to the title page shows that this book of 752 pages is an account of the mammals, birds, reptiles, and amphibians in a cross section of the Sierra Nevada. This volume splendidly supplements the "Handbook of Yosemite National Park," a compendium of articles on the Yosemite region by leading scientific authorities, compiled and edited by Ansel F. Hall and published in 1921.

In that so little was actually known regarding the birds, mammals, reptiles and amphibians of Yosemite National Park, the California Museum of Vertebrate Zoology undertook a survey of the vertebrate natural history of the Yosemite region in 1914. The field work covered a narrow strip of territory 17⅓ miles in width and 89¼ miles in length, this strip being intended to furnish a typical cross-section of the central Sierra Nevada, beginning at an altitude of 250 feet at Snelling and reaching to the top of Mount Lyell, which is slightly over 13,000 feet, and thence to Mono Lake. The extent of the survey is to be judged by the fact that 957 man-days (one man in the field one day) were put in with 2001 resultant pages of field notes, 700 photographs and 4354 museum specimens. A final date after which no new material was to be added was set as December 31, 1920.

On opening the volume, one finds a fine colored plate of the Sierra Nevada rosy finch as the fontispiece; this is followed by 11 other colored plates by Allan Brooks, and 48 uncolored plates, made from photographs, are bound at the back of the book. Particularly attractive and useful are those plates of the chipmunks, sparrows and woodpeckers, where the

*Grinnell, J. and Storer, T. I., Animal Life in the Yosemite, xviii plus 752 pages, 60 plates (12 in color), 2 maps (color), 65 figures in text. The University of California Press, Berkeley, California, 1924. Buckram $7.50. Carriage extra. Weight 5 lbs., 9 oz.

different varieties are arranged on the same page in relative size and exact color so that one may readily select the one which he wishes to identify. Several pages of spectrum-like plates prove to be tables showing the occurrence, according to life zone, of the mammals, breeding birds, reptiles and amphibians of the Yosemite section. A boat-shaped mark helps one to fix the places of maximum abundance. Correlation of these tables with the cross-section map and the zone inserted in the back of the book helps one to locate quickly, elevations and plant associations of any vertebrate found in the region. Ten pages are devoted to typical censuses secured at various points. The chapter on interrelations of living things is important enough and of sufficient interest to have been enlarged upon. Throughout the accounts of the species one may find numerous further discussions of the interrelations existing, as for instance, the economy of woodpeckers, to be found under the discussion of the white-headed woodpeckers, and the relation of pocket gophers to soil formation, under the heading of pocket gophers.

Specimens taken during the survey resulted in the naming of many as distinct subspecies, descriptions of which have already appeared in print. The list is a long one: Sierra mole, Mono mole, Yosemite meadow mouse, Mariposa meadow mouse, Sierra lemming mouse, Mariposa chipmunk, Mono chipmunk, Yosemite shrew, High Sierra bat, Yosemite coney, Mariposa cottontail, Sierra pine marten, Mariposa fox sparrow, Mono fox sparrow, Tenaya blue-bellied lizard, Yosemite toad and Mt. Lyell salamander. The first reliable information relative to the occurrence of the great gray owl was secured and valuable additions made to knowledge of the saw-whet owl.

In the reviewer's mind, this book has one lack which is a serious disadvantage to the average user. Suppose one finds a baby mallard duck and desires to find out something relative to the life history of the species, or, having heard that beavers inhabit the Merced River near Snelling, wishes to find out when and how the young are born and how many compose the litter. He will be disappointed in searching for such material in this book which by its title would lead him to think that such information were available.

In some instances full life history accounts will be found. Their lack under many write-ups is due to the fact that the members of the survey failed to find young during the investigations and no general life history information was culled from works other than those pertaining to the area worked. To some, a minor disturbing point will be found in certain plates which show dead animals. These are particularly distasteful because placed alongside of some beautiful photographs of live animals.

In general, these defects will be overlooked by most readers and the book will certainly be greatly appreciated by everyone who has reference to it. Unfortunately, the sale price of the book, though little more than actual cost, is likely to keep it from reaching the shelves of every public and school library and that of every lover of the out-of-doors, where it so richly deserves to be.—Harold C. Bryant.

INTERNATIONAL PROTECTION OF BIRDS PLANNED.

At its concluding session on May 24, 1924, President Coolidge's national conference on out-door recreation proposed the calling by the Washington Government of an international conference to formulate conventions "to protect migratory wild fowl and insectivorous birds."

The proposal was approved unanimously and Theodore Roosevelt Jr., chairman of the conference, said Secretary Hughes would be consulted at once regarding issuance of the call to the various countries interested.

The international conference would be composed of delegates representing the "nations constituting the Pan-American association and others adjacent to the United States."

PERTINENT RESOLUTIONS.

Among the resolutions adopted at the Tenth National Game Conference of the American Game Protective Association held in New York City December 10 and 11, 1923, are the two following:

"*Resolved*, That the Tenth National Game Conference of the American Game Protective Association goes on record as heartily favoring the adoption of anti-alien firearm laws by all states.

"*Resolved*, That the Tenth National Game Conference of the American Game Protective Association is in hearty sympathy with the movement to lessen the destruction of our fur-bearing mammals and advocates the establishment of appropriate closed season on fur-bearers and the licensing of all trappers and dealers in raw furs in all states."

HUNTING SEASON DATES ON DOVES CHANGED IN TWO STATES.

Changes in the open season for mourning doves in the states of Louisiana and Mississippi were approved by President Coolidge on April 11, 1924. The action

was taken at the request of sportsmen, game officials, and others, and on recommendation of the Secretary of Agriculture, who, under authority of the Migratory Bird Treaty Act, submitted the proposed amendment to the federal regulations. The amendment changes the open season for mourning doves in Louisiana from September 16-December 31 to the period November 1-January 31, and in Mississippi from September 16-December 31 to the period October 16-January 31. These changes were recommended by the Department of Agriculture, after careful consideration and upon the advice of the advisory board under the Migratory Bird Treaty Act. It is believed by the state game commissions and sportsmen concerned that the new open seasons will be more satisfactory than those previously in force.

ARE NESTING BIRDS ON THE INCREASE?

Bird censuses will again be taken on selected areas throughout the United States this summer, under supervision of the Biological Survey of the United States Department of Agriculture. The purpose of the censuses is to furnish information as to the exact number of birds nesting within the boundaries of selected tracts of land and to throw light on many problems concerning the distribution of bird life. There is a growing need for this information, especially in the proper administration of the Migratory Bird Treaty Act and bird protective laws in general, and it is hoped by the officials that many more persons will find time to take part in this interesting study. The work will be done at the height of the nesting season, which in many localities is about June 1, when the greatest number of birds have eggs or young in the nest. Facts regarding the numerical distribution of birds, their relative abundance, and any fluctuations taking place in their numbers are especially wanted. Bird censuses are the only means of obtaining much of this information. The data will be useful in showing what effect laws for conservation have had on the bird population of the country; how much birds have increased under protection; and what species have been most affected.

The Department of Agriculture depends wholly on unpaid assistance of volunteer observers in this work. The help received in the past has been greatly appreciated, and it is hoped that it may be increased. Detailed instructions for taking the censuses, with necessary blanks for reports, will be furnished on request addressed to the Biological Survey, United States Department of Agriculture, Washington, D.C.

FACTS OF CURRENT INTEREST.

A new supply of indestructible signs for the State's game refuges have been obtained by the Commission and are being placed. These signs are larger than the original tin signs and will, therefore, be more effective. Eventually, there will be no chance for criticism on the posting of refuges.

The Commission is contemplating placing on the back of the new issue of hunting licenses, a request for a detailed report of the game taken by each holder of a license together with a blank form for reporting the kill. This has been done with the object of obtaining some sort of basis for an estimate on the extent of the annual game harvest.

During late spring and early summer many streams dried up with a consequent loss of fish life.

An active campaign for an initiative to save the Klamath River as a notable fishing stream is being waged by the Klamath River Conservation League.

The search for tangible evidence as to the carriers concerned in the spread of foot and mouth disease led to frequent accusations against birds. A report, the result of an official investigation, will be found on another page.

No dependable evidence that deer are subject to the foot and mouth disease has been obtained although deer are said to contract the disease in the Philippines.

Executive Officer George Neale has been granted a leave of absence to visit relatives in England. Assistant Executive Officer J. S. Hunter is in charge during Mr. Neale's absence.

HATCHERY NOTES.

W. H. SHEBLEY, Editor.

THE SEASON.

Up to the middle of May, the take of eggs for use in the hatcheries was around the 26,000,000 mark. Perhaps a million or two more can be secured. The take along the coast has been very poor and the Klamath has failed to furnish its quota on account of the low water. However, due to new methods, some of the hatcheries in the Sierra are furnishing an unusual supply of eggs. On account of the low water the fish have not been easily trapped, but on the other hand, by working the streams, many spawners have been taken with small nets. Because of the ease with which fish have been secured in this way, one of these stations furnished 1,000,000 eggs as a result of one day's catch.

WATER SUPPLY FOR HATCHERIES LOW.

On account of the extremely low water in many parts of the state, it will be necessary to plant the fish much earlier than usual and without holding them until they are of fingerling size. By May 20th, the Brookdale Hatchery was forced to operate but a few troughs and by June the creek was practically dry and the work of the hatchery had to be abandoned. The Ukiah and Fort Seward hatcheries were forced to run at half capacity and closed unusually early. The Wawona Hatchery is suffering a lack of water and with the arrival of warm weather, the hatchery will have to be abandoned. In practically every hatchery of the state the water supply is expected to necessitate early planting of fish and early completion of the work.

SNOW MOUNTAIN STATION.

There has been no chance to operate the Snow Mountain Egg-Collecting Station this season as water has been 40 feet below the top of the dam and no water has entered the fishway. Some spawning fish worked up the river as far as Tomki Creek but this creek is now dried up and most of the fish lost their lives.

MOUNT WHITNEY HATCHERY.

On May 26th, the Rae Lakes and Cottonwood Lakes Egg-Collecting stations were opened. It is expected that 750,000 eggs will be secured at each of these stations. As 1,300,000 eggs were early shipped to the Mount Whitney Hatchery, operations there are under normal conditions.

KAWEAH HATCHERY.

There seems to be more snow at the head of the Kaweah than almost anywhere else in the high Sierras. Consequently, it is expected that the Kaweah Hatchery will be able to operate at full capacity. It is estimated that a suitable water supply will be afforded, provided the power house above continues in operation.

BEAR VALLEY HATCHERY.

A normal take of eggs, considering the season, was secured at Bear Valley Lake in southern California. It was impossible to operate the egg-taking station at Metcalf Creek but 25,000 eggs were secured on Grout Creek before it dried up. All of the rest of 1,500,000 eggs were secured on North Creek.

Reports are to the effect that black bass are increasing rapidly in the lake. This is most unfortunate for Bear Lake has been one of the best trout lakes in the state and practically the only one in southern California. Furthermore, it has furnished one of the best demonstrations of fish propagation, for practically no spawning has been possible in recent years and the supply in the lake has been maintained almost entirely by artificial means. Trout fishing has been particularly good this year since the opening of the season but every angler may well worry about the future as a result of the unfortunate, surreptitious planting of the lake with bass. Bass fishing can never be depended upon to the same extent as trout fishing and some day anglers will have much to say regarding the sneaky individuals who introduced bass into California's most famous trout lake.

KLAMATH STATIONS.

If there had been sufficient rain, the tributary streams of the Klamath would have furnished the usual supply of eggs. All four stations were operated but only a small proportion of the usual take was secured. In most instances, the water was too low to attract the large sea-run trout into the creeks.

DROUTH CONDITIONS AFFECT THE MOUNT SHASTA HATCHERY LESS THAN ANY OTHER.

Throughout the years this hatchery has proved to be the most dependable and it is no wonder that the largest output always comes from this station. At pres-

ent the normal number of eggs are being hatched and the work is proceeding as usual.

SALMON TAKE ONE-FOURTH OF NORMAL.

Unfortunate conditions on the Klamath prevented taking the usual twenty millions of eggs last fall. Gates were opened on the Copco Dam in order to make certain repairs, with the result that a flood swept down the river tipping the racks by two feet and allowing every trapped salmon to escape. It took days to clean up the debris left on the racks. It is estimated that between two and four thousand adult spawning salmon were lost, due to this flood. As a consequence, only five million eggs were secured.

MACKINAW TROUT TO BE INTRODUCED.

Fifty million Mackinaw trout now at the Mount Shasta Hatchery will soon be introduced into Clear Lake, this being the second large plant. Twenty-five thousand more will be shipped to Eagle Lake as a second stocking within a year.

CUTTHROAT TROUT TO BE PLANTED.

Due to arrangements with the U. S. Bureau of Fisheries, 300,000 cutthroat trout eggs are expected during July. The fry will be planted in the northwestern corner of the state, in Humboldt County and in the Lower Klamath Basin.

DERBY DAM INVESTIGATION.

Derby Dam built on the Truckee River by the U. S. Reclamation Service has prevented any migration of the fish out of Pyramid Lake, Nevada. These fish formerly traveled up the Truckee to Lake Tahoe. This past spring, A. E. Doney, A. E. Culver, of the Hatchery Department, and R. D. Duke, Attorney, were detailed to inspect the dam in company with J. F. Richardson, Government Reclamation Engineer, Joseph O. Jenkins, Indian Agent, J. Vogt, and J. F. James. It was shown that an auxiliary dam six feet high, placed diagonally across the stream, and the building of a canal to carry 50 second-feet of water, would provide a suitable fishway so that spawning fish might again travel up the river. The investigators were impressed with the possibilities of this solution of the problem.

FIG. 32. Klamath racks after the flood last fall when the gates at the Copco dam were opened in order to make repairs. All the trapped salmon escaped and it took weeks to clear the debris. Photograph by J. O. Snyder.

The Truckee River has been one of the most abused streams in the west. First, the problem was that of pollution from the sawmills. Evidence of the extent of this pollution can be seen when it is pointed out that a 1000-acre delta of sawdust debris was built at the head of Pyramid Lake as a result of turning refuse sawdust into the river. Then came the era of dams. Most of the dams were provided with fishways but the Derby Dam which diverts all but 22 second-feet of water through a power house and into the Carson Sink, has seriously affected the spawning of Pyramid Lake trout. Due to the diversion of this water, the lake is

now twelve feet below its former water line and the small amount of water still flowing into the lake spreads out over the delta, making it impossible for the fish to reach spawning grounds. The trout in Pyramid Lake are justly famous for they grow to be 15 to 30 pounds in weight.

NOTES FROM THE STATE FISHERIES LABORATORY.

WILL F. THOMPSON, Editor.

SAN PEDRO RARITIES.

During the past month, several uncommon fish brought to the Fresh Fish Market in San Pedro have created considerable interest among the local fishermen. About the middle of May a gorgeously colored fish, weighing about fifty pounds, was caught in barracuda nets one mile off Pt. Fermin. It was identified by members of the State Fisheries Laboratory as *Lampris luna*, called opah, mariposa or moonfish by those fortunate enough to have seen this stranger to our coast.

Lampris luna is the only known species of the family *Lampridae*. It apparently has a wide range, since specimens are occasionally taken in various parts of Europe, and on the eastern coast of North America. While records show that it may reach a length of six feet and a weight of five or six hundred pounds, no individual of more than two hundred pounds has been recorded on this coast.

In having a deeply-compressed ovate body the opah resembles the sunfish. Both these are also said to swim slowly near the surface in open water. Skeletal similarity between the two forms is, however, lacking. The scales of the moonfish are almost too small to be seen. No teeth are present in its small mouth. The splendid coloration of *Lampris luna* is so striking that one could not fail to recognize the fish instantly if one were to have the privilege of seeing it twice. Jordan describes it as "a rich brocade of silver and lilac." It is rosy underneath and spotted all over with round silvery dots about the size of a dime. The head and back have ultramarine tints, while the jaws and all the fins are vermillion. The flesh of this fish is of a very rich, delicate flavor, which some say is unsurpassed by that of any other fish.

FIG. 33. Dead steelhead trout on the Pajaro River, March 6, 1924. On this date dead trout lined the banks of the river for miles owing to low water and pollution. Photograph by H. C. Bryant.

Another rarity, *Brosmophycis marginatus* was caught the last week in May, 90 miles south of Los Angeles Harbor, with lines set deep for sea bass. Too rare to have a common name, this fish probably lives in moderately deep water, since its flesh, like that of many deep-sea species, was soft and flabby. The body was a bright reddish brown; the fins edged with brilliant rose-red. This specimen measured about fourteen inches, and agreed

in most particulars with Jordan and Evermann's description, made from an individual of almost the same length collected off San Francisco. A specimen taken in 1905 from Puget Sound and described by C. H. Gilbert and J. C. Thompson extended the known range of the species northward. We find no record that *Brosmophycis marginatus* has ever been seen from southern California waters until the present instance.—W. A. S.

THE FUTURE OF WORLD FISHERIES.

Pointing out what immense opportunities exist for the development of world fisheries, and giving an intelligent review of the problems at present confronting the industry in Europe, Mr. Neal Green, progressive Grimsby trawl owner, and manufacturer of fishery by-products, gave an address before the Royal Society of Arts, the substance of which, as reported in the *Fishing News* (Aberdeen) of April 5, should prove interesting to far-sighted fisheries men of all nations. Much greater production and transportation costs since the war have, he says, combined with an increasing popular tendency to demand better delivery service and more attractive products, to reduce very appreciably the profits of those engaged in the various branches of fishing and fish-refining. Mr. Green recommends improvement in methods of catching, transporting, preserving, and marketing, and exploration of hitherto unexploited regions as the means by which permanent prosperity and a growing trade may be assured.

Now that the advantages of fish meal for fertilizer and cattle and poultry feed has been widely demonstrated, the manufacture of these commodities, chiefly from parts and species formerly thrown away, has eliminated one of the greatest sources of waste in the early industry. Fishing on far-distant shores is now possible, due to improvements in concentration methods which may be used on board the very vessels making the catch. Thus the great potential fishery wealth of the Southern Hemisphere, almost untouched by the relatively small population on its borders, can now be brought in good condition to supply northern markets.

Mr. Green emphasizes the use of fish by-products for purposes other than food, as opening up the most promising field for development. New values and new methods of extraction and preparation are continually being invented for iodine, bromine, cod-liver oil, substances of high vitamine content, and other materials derived from fish tissues. The industry, aided by scientific research, is only starting to learn what vast resources of a chemical nature are stored up in fish, and

FIG. 34. Spawning steelhead trout killed as a result of low water and excessive pollution in the Pajaro River near Watsonville in early March, 1924. Steps are being taken to abate the pollution as a result of aroused public opinion. The fish were opened to show the thousands of eggs lost by the death of these large fish on their way to their spawning grounds. Photograph by H. C. Bryant.

to appreciate how these may be conserved and employed to the best advantage.

While the efforts of countless investigators have been applied to almost every imaginable problem relating to increased production and economy on land, study of the important sea areas has been relatively neglected. What may be the magnitude of the wealth which these will yield, when subjected to similar intensive cultivation, can only be guessed. The tone of Mr. Green's message is throughout encouraging. He regards present hard times as the very conditions which will make clear the necessity of new lines of effort and exploitation, and which, through these, will render the discovery of added power almost inescapable. "Fifty years has not seen the life of fishery progress," he says. "Very likely it has only ushered in its beginning."—R. R. M.

FISHERIES AND THE WAR.

The influence of the war on fisheries has demonstrated the effect that cessation of fishing for a few seasons has upon the abundance of fish.

A striking example of this is found in the southeast of Russia, in the mouth of the Volga River and is described by N. Borodin in *Science*, May 23, 1924, p. 461. During 1918 to 1920, fishing was entirely stopped here because of the nationalization of fisheries which resulted from a civil war within the Astrakan Government, the mouth of the Volga, which was the seat of operations, being the location of the most important Astrakan fisheries. This provided an opportunity for the fishes of commercial importance, such as the vobla, Caspian herring, pike-perch and sturgeon to enter the river and, without disturbance from fishermen, deposit their eggs in natural abundance. Most of these fish mature and spawn at three or four years of age and it is reported that in the Volga River last spring and fall (1923), there was an unusually large run of every kind of commercial fish. Due to the lack of equipment and organization of the industry, only about half the amount of fish was taken that was customary before the war, but the individual catches are said to have been "of fabulous size."

It is stated that an analogous case in the history of Russian fisheries is that of large catches of fish in the Sea of Azof for several years following the Crimean War. Owing to naval operations in the sea, all fishing was stopped, both there and in the mouth of the rivers emptying into it for two seasons and markedly increased abundance resulted.

LIFE HISTORY NOTES.

NASAL PARASITES IN DEER.

On April 17, a mule-tail fawn about ten months old was found dead in a corner of the elk paddock. The little buck had collided with the heavy wire fence with sufficient force to break his neck. He had been dead but a short time, and the carcass was brought to the Yosemite Museum that a specimen might be preserved. When the head was skinned out and the skull cleaned, both of the animal's nostrils were found to be gorged with huge squirming larvæ of a bot fly, perhaps *Gastrophilos nasalis*. Twenty of these grubs, ranging from one-half inch to one and one-half inches in length, were found.

These and other "bots" found under the skin of various animals are better known than the bumble-bee-like flies from whose eggs they hatch. In most cases the flies deposit their eggs on the hairs of the host animal. They are then taken into the mouth of the host, swallowed, and thus introduced to the stomach, to the walls of which the larvæ attach themselves or through which they burrow out into the body tissues, finally coming to rest underneath the skin. The fly that produces the nasal bots lays eggs directly into the nostrils. Here the parasitic larvæ remain through fall and winter and late in the spring release their hold, fall upon the ground, and burrow into it to pupate.

Cases of "craziness" in deer, due to the presence of nasal bots, have been recorded. There is a possibility that the great irritation caused this young buck to race blindly into the fence. However, the fact that he was in the elk corral and that the elk are known to give chase to the deer presents a more plausible explanation.—Carl P. Russell, Yosemite, California.

NO BIRDS TO CONTROL GRASSHOPPER PEST.

In 1922-23 a serious grasshopper plague visited southeastern Oregon and northeastern California. It is estimated that the damage in 1922 reached $200,000 and that there would have been still greater losses had not control measures been instituted. In 1923 grasshoppers were most abundant on the now dry lake called Tule Lake, or sometimes Rhett Lake, situated on the Oregon-California line and recently drained in order to secure additional agricultural land. The infested area was approximately 150,000 acres and the insect hordes, in some places cleaned up every

living plant, leaving a desolate waste. Many farmers had to give their entire time to fighting grasshoppers.

Some idea of the seriousness of the situation can be had from the following statement of ammunition used against the enemy in 1923: 2000 sacks of bran, 2200 sacks of sawdust, two carloads of molasses, 15,000 pounds of white arsenic, 60 gallons of amyl acetate, 30 cases of lemons and 5000 gallons of oil of various grades. A total of 600,000 pounds of bait was mixed and distributed, the cost being about $10,000. Klamath County, Oregon, Modoc and Siskiyou counties, California, the U. S. Reclamation Service and the U. S. Indian Service helped to finance the work.

You may wonder what relation such an outbreak has to wild life. There is every reason to believe that the draining of Tule and Lower Klamath lakes has had a direct bearing upon this visitation of grasshoppers. It is well known that gulls are efficient destroyers of this pest and it will be remembered that the crops of the Mormons were saved more than once by the influx of gulls. These two lakes formerly furnished breeding grounds for thousands and thousands of gulls and other water birds which were undoubtedly responsible for holding many insects in check so as to prevent their becoming destructive. With sudden spoliation of their breeding grounds, these birds were forced to leave this area with resultant insect outbreaks.

FIG. 35. Valley elk in Yosemite Valley. A small herd placed in the Valley by the California Academy of Sciences attract a great deal of interest. Five young have been born and the herd thrives. Photograph by H. C. Bryant.

County Agent, C. A. Henderson reported: "Poisoning work was carried on throughout 27 districts in Klamath County and northern California, over 500 farmers participating, in some districts it being necessary to discontinue all other work and use all time for combating this pest for a period of 30 days. Poisoned bran mash was the basic poisoning agent and in the majority of cases exceptionally fine results were secured."

Special flame throwers were devised. These instruments of destruction utilized crude oil and were mounted on light trucks. Five thousand gallons of oil were utilized, the oil being forced through a hose at high pressure. Ditches placed in advance of the grasshopper hordes netted myriads of insects, 18 gallons of grasshoppers being taken from a single pit.

In recent years, there has been no plainer demonstration of what is to be expected when we destroy an important natural check on insect life. When will we learn that so great a disturbance of the balance of nature as results from the drainage of large lakes always results in serious consequences? When insects are kept down to normal numbers we have no trouble but when they are allowed to increase we have a plague and it takes dollars to control the situation as well as dollars to cover losses.—Harold C. Bryant, Berkeley, California.

RABIES EPIDEMIC AMONG GRAY FOXES.

Late in April, 1924, Deputy Euell Gray of Placerville, sent in the head of a California gray fox (*Urocyon cinereoargenteus*

californicus) which had died from a disease epidemic among predatory animals in the Cosumnes River district, southern El Dorado County. This was turned over to the State Hygienic Laboratory, University of California, Berkeley, for examination and was found to be positive for rabies. On June 1, 1924, Deputy Gray furnished the following note relative to the epidemic:

"Owing to the fact that the area in which the gray fox has been found dead is a very brushy country, and that only the animals which have died along the trails could be found, it has been a very difficult matter to take a census of the animals dead of the disease. The district embraces an area of about five or six miles square, in the vicinity of Nashville, and on both sides of the Cosumnes River.

"Four dead coyotes were first reported from this district in the latter part of 1923. As farmers were using poison in the vicinity, it was supposed the animals had been poisoned. In January, 1924, dead foxes were found in the same vicinity on the south side of the Cosumnes River and were also supposed to have been poisoned. About two months later, foxes were reported dead on the north side of the river and about twelve were found. No other animals except coyotes and foxes have been found dead in that vicinity but dead gray foxes are now being found as far as ten miles from that district.

"The foxes, before death, become very stupid and wander around in a blind condition, frothing at the mouth a great deal. They show no inclination to get out of one's way and they have been killed with sticks, stones and so forth. One was shot by the night watchman on the main street of Placerville."

As far as I can ascertain this is the most extensive epidemic of rabies among foxes yet reported from this state. That the disease at times makes serious inroads upon the coyote population is well known. From the foregoing evidence it appears that foxes are subject to rabies and that similar epidemics to those among coyotes are to be expected among foxes.—H. C. Bryant, Berkeley, California.

FIG. 36. Poison spreading squad in Langell Valley, Oregon, ready for action. A wagon load of poisoned bran mash was used on the day the photograph was taken. Photograph by C. A. Henderson.

FIG. 37. Destruction of a grain field on Tule Lake showing where the grasshoppers were stopped by a combination of poisoning and burning. Approximately 200 acres of grain were destroyed by grasshoppers in this one field. Photograph by C. A. Henderson.

CONSERVATION IN OTHER STATES.

NEW JERSEY PROFITS BY A GOOD DEER LAW.

In 1914, the total kill of deer in the state of New Jersey was eighty. A report of the game commissioner was that last year 1084 were killed. The future of sport seems assured therefore, if an equal increase can be expected in the next ten years. It is indeed encouraging to report such a splendid increase in one of the older states and close to great centers of population.

VIRGINIA ATTEMPTS DESTRUCTION OF CARP.

It is said that New Jersey has succeeded in reducing carp to a minimum. Virginia has been making a study of the work carried on in New Jersey and is now planning control measures. On the supposition that carp are very destructive to valuable food fishes, the new uniform game law recently passed provides that the commissioner may issue permits for the taking of German carp in nets or by other means legal in the taking of other fish.

VIRGINIA'S FIRST UNIFORM GAME LAW.

The last session of the Virginia legislature passed a uniform game law, the more important provisions of which are:

Uniform hunting season throughout the state, November 15th to January 31st, inclusive, doing away with special provision for west of the Blue Ridge mountains.

Placing a limit of one deer a day and two in one season to one hunter, and only bucks with horns visible above the hair to be killed. Season shortened to forty-five days.

Making it unlawful to sell game, but not to buy same. Friends of game law enforcement may now buy game for evidence without fear of prosecution.

Making the Virginia law conform strictly to the Federal Migratory Bird Law and providing punishment for violations by state law. Heretofore the game wardens of Virginia had no jurisdiction as to migratory birds under federal law.

Placing a season bag limit, as well as continuing the daily bag limit, on certain game, including migratory game birds.

CONGRATULATIONS, MARYLAND!

The Maryland Conservationist made its initial bow to the public in its January issue, Vol. 1, No. 1. The magazine contains 30 pages of interesting articles and illustrations of wild life in Maryland. Both Commissioner Harrison W. Vickers, Jr., and Swepson Earle, the editor, are to be congratulated for the publication of such a high class magazine. We take the liberty to reprint certain phrases which are of interest to all of us and which can apply to every state.

"Conservation may be a new word to many Marylanders, but it is here to stay; get familiar with its meaning.

"The strength of a nation is measured in natural resources. Conserve our wealth.

"Without seeding, Marylanders have reaped—but the crop is getting short.

"We are the trustees, but not the owners of our natural resources."—*Conservation News* (Louisiana), March, 1924.

VIRGINIA STARTS EDUCATIONAL CAMPAIGN.

Following the lead of California, the Department of Game and Inland Fisheries of the state of Virginia, has started an educational campaign and is now publishing *The Game and Fish Conservationist*, in which they have taken over in full the motto originated by the California Commission, "Conservation of Wild Life Through Education," this appearing as the main heading of the magazine.

Perusal of the March-April number shows that Virginia has waked up and that its Department of Game and Inland Fisheries has been actively engaged in putting over a worth while program. However, it is our opinion that the damage caused by "varmints" and the importance of predatory animal control are over emphasized. A dozen motion picture films are utilized and numerous lectures are given in connection with the educational campaign.

MASSACHUSETTS PROTESTS CROW SHOOTING.

Massachusetts conservation and agricultural officials have joined in a telegram of protest to the Du Pont Powder Company against its proposed nation wide crow-shooting contest. The telegram expressed the belief that the number of crows should be reduced when they become destructive to crops or to other bird life, but that a nation-wide extermination campaign is a mistake. It referred to the danger of indiscriminate slaughter among nesting game and song birds and to the fire risk.

The telegram was signed by William A. L. Bazeley, commissioner of conservation; A. W. Gilbert, commissioner of agriculture, and by the director of the division of fisheries and game, the state ornithologist and the state fire warden.

OREGON FISH COMMISSION PROTECTS CLAMS AND CRABS.

Believing that clams and crabs are in need of protection, the Oregon State Fish Commission has ordered that crabs and clams taken in Netarts Bay, Tillamook County, shall be sold only in that county after June 1. In addition, a daily limit of three dozen clams and six crabs has been fixed for tourists and residents, and crabs under the commercial limit of six and one-half inches may not be taken for private consumption. The new regulation also prohibits the use of clams for crab bait.

NEW JERSEY CHANGES GAME LAWS.

Due to demands from sportsmen, several conservation measures have been enacted by the New Jersey legislature. Included are: reduction of the daily bag limit on rabbits from ten to six and a daily bag limit of six on gray squirrels; the fixing of a season and placing of a daily limit of 25 on yellow perch. This will protect, during the spawning season, one of the state's most popular and common game fishes.

Another change was made in the game laws which, as in New York and other neighboring states, will permit the baiting of waterfowl with rye, wheat, oats, corn and other cereals in addition to wild celery and wild rice, confining the restriction against baiting to within 400 feet of any gunning point.

THE LATEST IN SANCTUARIES.

In connection with the project of the Belgian Government to create a great National Park and Gorilla Sanctuary in the Belgian Congo in South Africa, Mr. Carl Akeley of the American Museum of Natural History has been asked by the Belgian Ambassador to the United States to collect data from the National Park Service on the management and control of National Parks in the United States. The original proposal to establish a sanctuary for the preservation and study of the rapidly disappearing gorilla has been widened to include great game fields and a region which comprises some of the most beautiful of African scenery.

The plan, according to *Forest and Stream* for May, 1924, is possibly an outgrowth of the visit of the King and Queen of the Belgians to the United States in 1919, when they toured a number of American National Parks and were so impressed with what this country is doing in the preservation of native fauna and flora and the setting aside of great scenic areas for the benefit and enjoyment of the people, that they were moved to turn the Royal Forests of Belgium into a national park.

WISCONSIN PROTECTS AMERICAN LOTUS.

Wisconsin has joined the ranks of states which have enacted laws for the protec-

tion of native plants and now prohibits the sale of seed pods of the American lotus. The growing commercial trade in these ornamental seed pods was threatening this plant with extinction.

Connecticut, Vermont, Maryland, California and Illinois have laws for the protection of one or more disappearing species and similar laws are needed in other states if some of our most beautiful native plants are to be preserved. Maryland has probably the most drastic law, prohibiting the picking of all wild flowers without permission from the owner of the land.

FISHCULTURAL OPERATIONS IN IDAHO AFFECTED BY DROUTH.

With all hatcheries filled to capacity this summer with fingerling fish, and with many streams badly in need of restocking expected to go dry, Idaho State Fish Commissioner, W. M. Keil, has appealed to sportsmen and to fish and game associations to assist the department by furnishing information regarding streams and lakes in which it will be safe to plant fish this season.

With the assistance of interested sportsmen, trout in spawning condition are being salvaged from Camas Reservoir in Elmore County, which is rapidly going dry. In the *Mountain Home Republican* of May 30, State Game Warden R. E. Thomas is quoted thus: "To date, 515 trout, varying in length from 16 to 22 inches, have been salvaged and placed in the South Fork of the Boise River above Arrowrock Dam. The fish have been transferred full of spawn without injury and it is predicted that the salvage work will result in the ultimate stocking of the Boise River above this dam."

NEW ZEALAND BOASTS OF AMERICAN TROUT AND SALMON.

New Zealand has been very active in the acclimatization of American food and game fishes. A recent report from Mr. George M. Thompson, who is gathering information relative to the various species introduced, states that Mackinaw trout are naturalized in some small lakes in the middle ranges of South Island, and some species of catfish are to be found in Lake Mahinapua on the west coast of the island. The sockeye salmon as well as the quinnat or king salmon is naturalized, the former being found in Lake Ohau.

UNITED STATES FOREST SERVICE COOPERATION.

PAUL G. REDINGTON, Editor.

HELP PROTECT CALIFORNIA'S FOREST WEALTH.

Shall we reduce fire losses in California by individual cooperation and care, or allow our valuable forests to become unproductive acres and an overwhelming economic burden?

Forest Protection Week, proclaimed by President Coolidge in accordance with precedent first established in 1921 by the late President Harding, will be observed throughout the nation during the period April 21 to 27, inclusive. Of the numerous weeks dedicated to worthy purposes, no other is so closely related to the continued well-being and prosperity of California as this week, which has for its objective the awakening of the public conscience to a realization of the value of our magnificant forests and the necessity for their wise use and perpetuation.

Throughout the centuries the world's civilization has been built on a foundation of wood, and the high plane of American culture, of which we boast, is due in a large measure to industrial and social progress made possible by an unlimited wealth of forest resources. "A country without trees is a country without hope," and the pages of history are replete with examples of nations that have lost their high place in the councils of the world through the ruthless destruction of their forests.

The spectre of waning timber resources has already cast its lengthening shadow over a large part of the United States. The vast pineries of Maine and the Lake states have passed into history; the "inexhaustible" forests of the south are rapidly following in their wake, and "the most wonderful forests the world ever knew"—the heritage of every American—are making their last stand against the westward sweep of civilization in the rugged mountain ranges that overlook the Pacific. Fifty per cent of all the virgin timber that is left in the United States is today in the three states of California, Oregon and Washington, and of this available supply some 14 per cent is in California.

The forest lands of the Golden State are one of its greatest natural assets. They cover a total of 15,500,000 acres of timbered and potential forest land—an area greater in size than the states of New Hampshire, Massachusetts, Rhode Island and Connecticut combined. In value they represent over $750,000,000 worth of standing timber, and in volume it is estimated that they contain sufficient lumber

to build 43,000,000 five-room bungalows. More than 25,000 men are engaged in lumbering and wood using industries which annually turn out products valued at $100,000,000. We may treat all this wealth of forest resources like those that are "mined," never to be replaced; or we may, by combining scientific management with sensible utilization and protection, make them sufficiently productive to supply all our future timber needs. But we can not "have our cake and eat it."

Timber, however, is not the only valuable resource of California's mighty forests. As a conserver and regulator of water flow they stand preeminent. Within them are found the watersheds which furnish the domestic and municipal water supply of hundreds of cities and towns. Two-thirds of the 7,000,000 horsepower of potential hydro-electric energy that can be developed in the mountain regions of the state are within their boundaries. Over 85 per cent of the 4¼ million acres of farms and orchards now under irrigation are directly dependent on the forests for water. Hundreds of thousands of cattle and sheep which go to furnish the meat supply of the country are grazed on forest ranges. And in addition to all these commercial values are the intangible assets of good health and recreation, which the forests, as the great summer playgrounds of all the people, furnish.

All these forest resources may be destroyed by selfish exploitation, unfavorable legislation or by fire—but the greatest of these destructive agencies is FIRE. California, with a record of 2240 conflagrations that burned over 942,565 acres, was the worst fire state in the Union in 1923. And the responsibility for these fires and the resultant damage, which amounted to over 1¾ million dollars to timber and property, largely rests on our citizens; for 70 per cent of all the fires that occurred were man-caused through careless acts that could have been prevented.

FOREST FACTS FOR CALIFORNIA.

Timber Resources.

Total area of timberland—13,500,000 acres.

Brush and potential forest land that should be growing trees—2,000,000 acres.

California contains 15 per cent of all the remaining virgin timber in the United States.

Forests of California contain enough lumber to build 43,000,000 five-room bungalows, or to lay a board floor, one inch thick, over the entire states of Massachusetts and Rhode Island.

The timber resources of California are valued at $750,000,000—an amount sufficient to start a bank account of $220 for every man, woman and child in the state.

Lumbering ranks fourth among the industries of California in the number of wage-earners employed, and fifth in the value of its products. Twenty-five thousand people are yearly engaged in the lumbering and wood-using industries of the state, and the value of timber and lumber products amounts to $100,000,000.

National Forests.

The National Forests of California are 17 in number and cover an area of 19,297,896 acres (net) of mountain land.

Roads and Trails (Proposed and existing):

Roads in National Forests—7,500 miles, approximate.

Trails in National Forests—10,000 miles, approximate.

Total amount of National Forest road and trail funds spent to June 30, 1923—$4,340,000.

Receipts and Disbursements:

Receipts (Fiscal year ending June 30, 1923)—$1,275,000.

Disbursements (Protection and administration)—Average yearly expenditure—$1,000,000.

Twenty-five per cent of all National Forest receipts are returned to the state for apportionment to counties in which National Forests are located, for schools and roads.

Ten per cent additional of National Forest receipts are spent by the Forest Service on road and trial construction in the counties in which the National Forests are located.

Grazing and Wild Life.

195,000 cattle and 467,000 sheep grazed in the National Forests of California last year. These numbers represent 13 per cent of all the beef cattle in the state, and 19 per cent of all the sheep.

The total estimated number of big game animals in California is: Deer—250,000; Bear—12,000; Elk—150; Antelope—500; Mountain sheep—10,000. Fully 75 per cent of all the big game animals in the state live within the National Forests.

Practically all the important trout streams in California have their source within some one of the National Forests.

Water Conservation.

Of the 4,000,000 acres of irrigated land in California, it is estimated that 85 per cent is directly dependent on the National Forests for water supply.

Of the 7,000,000 h.p. of potential hydro-electric development in the State of California, fully $\frac{2}{3}$ is located within the National Forests.

Many cities and towns in the state are entirely dependent on the National Forests for their domestic and municipal supply of water.

Recreation Travel.

The National Forests of California are the greatest summer playgrounds of America. In 1923, over 4,336,000 people visited the National Forests of California. Of this total, 2,420,000 were transient motorists; 768,000 picnickers; 618,000 campers; 430,000 hotel and resort guests; and 100,000 summer-home owners, etc.

88 per cent of all the visitors to the National Forests were motorists.

Forest Fires.

United States, 1923.

Total number of fires—Over 30,000.

Total area burned over—11,500,000 acres.

Per cent of man-caused fires—80 per cent.

The acreage of forest land swept each year by fire is about twice the area annually cut over by logging operations.

Forest fires annually destroy enough timber to build houses for the entire population of a city the size of San Francisco.

California, 1919-1923, inclusive.

Total number of fires (forest, brush and grain)—11,185.

Area burned over—2,841,000 acres.

Per cent of man-caused fires—82 per cent.

Cost of suppressing fires (federal and state)—$1,112,830.

California, 1923.

In 1923, California was the worst fire state in the Union.

Total number of fires (forest, brush and grain)—2,349.

Area burned over—753,000 acres.

Per cent of man-caused fires—70 per cent.

California National Forests, 1922-1923.

Total number of man-caused fires—1,492.

Total nomber of fires started by smokers—689.

Per cent of man-caused fires started by smokers—47 per cent.

TAKE THE OLD BLACK PIPE.

"Look over that list, will you, Bill? Think I've put in everything I positively need and left out everything unnecessary. We'll just multiply that by five and there you are."

"Powerful lot of sugar—and beans! Why man, we'll only be out over two Sundays, why three pounds of beans apiece—no five, and part of them brown! Golly, man, d'ye think I'm a dago, to eat brown beans?"

"Doll, she did the grub—says we want heaps of sugar where it's cold, and that sugar is easier to pack and lighter than syrup—that we can make our own sugar syrup for hot cakes. Guess she knows. Same about beans—you'll notice that we have precious little canned meat—beans will be our steady, and with plenty of seasoning beans will taste good, believe me. Ever try 'em down at Domenici's? They say they're better yet at an elevation of 7000."

"We-e-ell, if you're sure—but I've got you in one place, Old Timber—not a Camel in the bunch!"

"No, nor there ain't going to be—nor in your jeans either. I set a forest fire once, and believe me I set no more. Here in town a cigarette stub lands in a concrete gutter and dies peacefully. Up there it lights in a bunch of dry pine needles and while it is slowly dying it sets the world afire."

"Nonsense!"

"That's not argument, Bill—it's—it's—say persiflage. This is one case where I KNOW, AND NO PARTY I GO WITH TAKES A CIGARETTE. Besides, a pipe tastes heaps better. My wife never lets me smoke one at home—has an idea it smells. Out of doors Old Comfort and I can have peace.—Charles H. Shinn, U. S. Forest Service.

FORAGE CONDITIONS IN GAME REFUGE 1-D.

Reports and articles have been circulated from time to time during the past few years of the overgrazed conditions in Game Refuge 1-D in the Trinity National Forest resulting in losses of deer due to lack of suitable forage to carry them through the winter season. These alleged conditions have been attributed to the policy of the Forest Service in issuing grazing permits within this refuge. The statements made would lead one to believe the federal government was interested only in the few cents per head it received in grazing fees, and not at all in the welfare of the deer. On receiving a similar report this year that a loss of deer was occurring in this refuge from lack of forage, I visited the area during the fore part of March and made a personal examination of that portion of the refuge (namely along the Trinity River)

where it was claimed the loss was occurring.

Generally speaking, the game refuge occupies roughly rolling country cut by deep canyons. There are practically no glades or meadows. The south exposures are largely browse—covered with fingers of yellow pine and Douglas fir along the drainage lines. The characteristic browse plants include live-oak, manzanita, quinine brush (*Garrya*) and chaparral (*Ceanothus conеatus*). Mingled with them on rough slopes and dominating the high ridges and north exposures occur: big leaf mahogany, sweet birch, several oaks, service berry, sweet birch, poison oak, cherry, gooseberry, rose, etc. The ground feed consists of a more or less scattered growth of angellica, parsnips, legumes, and some blue grasses, fescues, and annual grasses. Altogether, a good deal of feed is available, but because of the rough topography, a large part of the refuge can be used only by deer or other game animals. It is true that within a mile or so of the ranches along Trinity River and for a distance up Manzanita Creek, the feed is largely utilized by small bunches of cattle, but over the bulk of the refuge cattle do not compete seriously with deer for feed.

A large number of deer were seen on different portions of the refuge, all in good condition. I could find no instance of deer having died from lack of forage. Even the few cattle and horses found wintering along the Trinity River were in good condition.

There has been a considerable loss of deer in Game Refuge 1-D during the past few years from predatory animals, principally from coyotes and bobcats. Probably the loss of deer from this cause has heretofore been attributed to starvation. The poison campaign conducted there the past winter by the Biological Survey and the Forest Service showed that predatory animals were making heavy inroads on the deer as many carcasses were found. The refuge was thoroughly covered with poison baits and the results carefully checked. Many dead predatory animals were found and the loss of deer immediately stopped. There is urgent need of more campaigns of this sort if the loss of all kinds of game animals and birds from this cause is to be reduced to the minimum.

The Forest Service is not managing the forests on the basis of revenues received. If it were, the grazing fees would be materially increased. However, it does believe that settlers living within the forest should be provided with range for the few head of stock used in connection with their ranch property, especially when this can be done without injury to other public interests, as is the case along the Trinity River.—J. W. Nelson, Assistant District Forester, San Francisco.
May 17, 1924.

CALIFORNIA FRESH FISHERY PRODUCTS FOR MONTHS OF JANUARY, FEBRUARY AND MARCH, 1924.

Compiled by Fish and Game Commission, Department of Commercial Fisheries.

Species of fish	Del Norte, Humboldt	Mendocino, Sonoma, Lake	Marin	Solano, Yolo	Sacramento, San Joaquin	Alameda, Contra Costa	San Francisco, San Mateo	Santa Cruz	Monterey	San Luis Obispo, Santa Barbara, Ventura	Los Angeles	Orange	San Diego, Imperial	Total	Mexican, brought into California via San Pedro	Mexican, brought into California via San Diego
Albacore																
Anchovies							18		7,100		8,388			15,506		
Barracuda									10	105	13,781		99,387	113,733	800,953	169,837
Bluefish								12	1,209					1,221		
Boccaccio							14,688	50,055	144,657	934				210,334		
Bonito											14,033		8,026	22,059	107,816	56,347
Carp				1,349	7,642	19,061	612							28,664		
Catfish		17,737		422	34,020	14,962								67,141		
Chilipepper							95	5,057						5,152		
Cultus Cod	168	1,670					34,251	2,597	19,948					58,634		
Dolphin																
Eels																
Flounders	11,615		12	2,781		7,772	47,711	1,697			66			71,654		
Grayfish							47,700				130		84,757	132,587		
Greenfish																
Hake							537							537		
Halibut	123	81					1,590	193	1,388	90,724	339,387	54,297	96,639	584,422	5,788	167,744
Hardhead					7,243									7,243		
Herring	892		465			56,150	246,916	530					1,746	306,699		
Kingfish								6,803	48,030		95,248	36	1,860	151,977	215	70
Mackerel									137,252	1,577	579,780	48,950	83,299	850,858	1,832	3,463
Marlin																
Mullett													19,222	19,222	2,771	27,397
Perch	20,706	809	14,432			266	29,935		5,183	149	15,155		537	87,172	7,110	6,161
Pike				41	107	2,692	43							2,883		630
Pompano									52		1,573			1,625	332	3,530
Rock Bass										1,073	15,602	5,312	10,794	32,781	12,135	49,149
Rockfish	363	12					80,428	49,946	92,357	5,292	775,210	14,534	376,161	1,394,403	170	19,267
Sablefish							54,442	354,171	1,770					410,383		
Salmon	126			10,620	8,202	10,613	129,267	847	842					160,517		
Sandabs		3,720					273,500		936		2,271	79		280,506		
Sardines							552		25,673,370		55,407,808	80	3,124,640	84,206,450		
Sculpin											25,273	41	9,461	34,775		
Sea Bass—Black										340	2,380	508	6,929	10,157	8,602	66,459
Sea Bass—White									96	6,791	10,718	4,415	4,251	26,271	12,987	9,325
Sea Trout													475	475		6,071
Shad				772	1,335	13,377	180							15,664		
Shad—Buck				4,761	172	33,083								38,016		
Shad—Roe				7,464	153	33,340								40,957		

Sheepshead										409	5,248	23	1,098	6,778		470
Skates							44,007				3,909			47,916		
Skipjack																
Smelt	9,195	1,891	8,884			153	41,832		2,087	18,063	79,983	6,491	3,943	172,522	600	1,858
Sole	205	9,420					1,857,669	1,810	26,770	13,037	9,978	2,512	9,048	1,930,449	165	2,021
Splittail					2,672									2,672		
Striped Bass			987	16,053	36,222	102,582	12,339							168,183		
Stingaree																
Suckers					278									278		
Surf Fish																
Swordfish																
Tomcod						20	4,885							4,905		
Trout—Farm																
Trout—Steelhead																
Tuna															21,387	
Tuna—Bluefin																
Tuna—Yellowfin													530	530		19,034
Turbot			306											306		
Whitebait	3,331	12	648				231							4,222		
Whitefish										160	85,931		2,384	88,475	1,029	14,242
Yellowtail											43,067	503	87,943	131,513	420,320	324,685
Miscellaneous	42	35,550		128		538	24,257	422	1,296	6,667	17,137	801	5,484	92,322	3,475	3,205
Total fish	46,766	70,902	25,734	44,391	98,046	294,609	2,947,685	474,140	26,164,353	145,321	57,552,056	138,682	4,039,064	92,041,749	1,407,687	950,965
Crustaceans																
Crabs	[1]69,072		[2]48			[4]1,296	[5]461,928	[7]3,336	[8]2,232					[9]537,912		
Ecrevisse																
Shrimps			51,450				100,182							151,632		
Spiny Lobsters										20,663	26,713	6,527	42,864	96,587		417,502
Mollusks																
Abalones									187,875	427				188,302	5,000	
Clams—Cockle			930								720			1,650		
Clams—Mixed	5,290	1,114	7,591											13,995		
Clams—Pismo									15	55,185				55,200		
Clams—Softshell		969	19,600			31,035	[3]13,390							64,994		
Cuttlefish	31						1,698	41,599	28,497				25	71,850		
Limpets																
Mussels							2,029		4,705	77		1,825		8,636		
Oysters—Eastern			[3]124,935				[6]38,665							[10]163,600		
Oysters—Native																
Snails																
Squid									57,477		49,707			107,184		
Miscellaneous																
Frogs																
Terrapins																
Turtles																
Totals	121,159	72,985	230,288	44,391	98,046	326,940	3,565,577	519,075	26,445,154	221,673	57,629,196	147,034	4,081,773	93,503,291	1,412,687	1,368,467

All amounts shown in pounds unless otherwise specified. Albacore and skipjack cleaned.

[1]2,878 dozen. [2]2 dozen. [3]567,890 shell oysters. [4]54 dozen. [5]19,247 dozen. [6]175,750 shell oysters. [7]139 dozen. [8]93 dozen. [9]22,413 dozen. [10]743,640 shell oysters.

REPORTS.

VIOLATIONS OF FISH AND GAME LAWS, 1923-24.

GAME CASES.

July, August and September, 1923.

	Number arrests	Fines imposed	Jail sentences (days)
Hunting without license	34	$530	
Deer—killing, possession, closed season	25	1,610	
Deer—hide, evidence of sex removed	4	150	
Deer—failure to retain horns, hide	6	175	60
Deer—kill does or fawns	38	2,900	
Deer—running with dogs; closed season	1	25	
Bear—closed season	2	35	
Ducks—killing, possession, closed season	15	290	30
Mudhens—killing, possession, closed season	2	35	
Shorebirds—killing, possession, closed season	9	365	
Doves—killing, possession, closed season	19	475	
Doves—over limit	6	155	
Wild pigeon—killing, possession	1	25	
Quail—killing, possession, closed season	24	685	10
Pheasant—killing, possession	1	100	
Non-game birds—killing, possession	3	30	
Tree squirrels—killing, possession	1	25	
Rabbits—cottontail, brush, killing, possession, closed season	5	75	
Sale of deer meat	1	100	
Night hunting	1	25	
Shooting from automobile	2	25	60
Game refuge, hunting or possession of firearms	12	195	
Totals	212	$8,030	160

FISH CASES.

July, August and September, 1923.

	Number arrests	Fines imposed	Jail sentences (days)
Angling without license	9	$225	
Trout—over bag limit	8	666	
Fishing—within 250 feet of fishway	7	150	
Fishing—within 100 feet of dam	1	25	
Night fishing—taking of game fishes	8	150	
Striped bass—taking, possession, closed season	1		150
Striped bass—undersized, over bag limit	19	345	
Crabs—possession, undersized	4	45	
Clams—closed season	3	75	
Clams—undersized, over bag limit	15	465	
Lobsters—closed season	1	25	
Abalones—undersized, over bag limit	30	1,055	
Abalones—failure to bring ashore alive	4		
Sale of shell fish—no license	1	10	
Fishing without commercial fishing license	18	290	
Barracuda—undersized	6	190	
Illegal possession or use of nets	6	400	
Totals	141	$4,116	150

SEIZURES OF FISH AND GAME.

July, August and September, 1923.

Ducks	75	Salmon, pounds	16
Shorebirds	4	Striped bass	60
Quail	14	Striped bass, pounds	856
Wild pigeons	2	Halibut, pounds	300
Doves	141	Spotfin croaker, pounds	400
Pheasants	1	Barracuda, pounds	3,443
Non-game birds	6	Lobsters	3
Bear meat, pounds	40	Crabs	209
Deer meat, pounds	1,212	Abalones	260
Squirrels	2	Clams	902
Rabbits	2	Sturgeon, pounds	140
Trout	583		

GAME CASES.

October, November and December, 1923.

	Number arrests	Fines imposed	Jail sentences (days)
Hunting without license	50	$820	
Deer—killing, possession, closed season	27	1615	
Deer—running with dogs, closed season	1	25	30
Deer—failure to retain hide, horns	2	50	
Deer—killing, possession, does or fawns	16	2,050	
Bear—killing, closed season	1	10	
Ducks—over bag limit	18	1375	60
Ducks—purchase or sale of	4	400	
Ducks—killing of woodducks	1	25	
Swans—killing or possession	3	75	
Shorebirds—killing or possession	13	255	
Doves—killing, possession, closed season	4	75	
Quail—over bag limit	1	100	
Quail—killing, possession, closed season	18	605	90
Pheasants—killing, possession	2	50	
Non-game birds—killing, possession	19	785	
Trespassing	11	235	
Shooting game from automobile, powerboat	15	525	
Night hunting	84	2,105	
Game refuge—hunting or possession of firearms	5	90	
Trapping without license	1	25	
Totals	296	$11,295	180

FISH CASES.

October, November and December, 1923.

	Number arrests	Fines imposed	Jail sentences (days)
Angling without license	5	$115	
Trout—over bag limit	4	200	
Black bass—taking, possession, undersized	1	25	
Black bass—taking possession, closed season	5	450	
Night fishing—taking of game fishes	16	370	
Fishing—within one-half mile of hatchery in operation	1	25	
Striped bass—taking, possession, closed season	2	40	
Striped bass—undersized, over bag limit	6	115	
Striped bass—sale, closed season	1	25	
Salmon—taking, possession, closed season	1	50	
Salmon—over bag limit	2	150	
Salmon—closed season, untagged	1	150	
Crabs—taking, possession, undersized	3	60	
Crabs—taking, possession, closed season	4	80	
Clams—taking, possession, closed season	1	75	
Clams—undersized, over bag limit	46	1,905	30
Lobsters—possession, sale, closed season	1	25	
Lobsters—undersized, oversized	25	1,325	
Abalones—taking, possession, over bag limit	8	200	
Abalones—taking, possession, undersized	11	885	
Catfish—sale of, undersized	1	20	
Failure to keep commercial fishing data	1	100	
Nets—illegal possession or use of	11	925	
Totals	157	$7,315	30

SEIZURES OF FISH AND GAME.

October, November and December, 1923.

Ducks	2,673	Salmon, pounds	1,793
Geese	5	Catfish, pounds	66
Shorebirds	32	Striped bass, pounds	157
Quail	2	Lobsters	188
Pheasants	2	Lobsters, pounds	1,271
Non-game birds	206	Crabs	29
Deer meat, pounds	583	Crabs, sacks	10
Trout	20	Abalones	206
Salmon	14	Clams	3,39 5

GAME CASES.

January, February and March, 1924.

	Number arrests	Fines imposed	Jail sentences (days)
Hunting without license	18	$320	
Deer—killing, possession, closed season	33	1,195	173
Deer—killing, possession, does or fawns	1	50	
Deer—skins, evidence of sex removed	1	25	
Deer—skins, sale of	1	25	
Ducks—over bag limit	6	125	
Ducks—killing, possession, closed season	14	400	
Geese—killing, possession, closed season	9	175	
Shorebirds—killing, possession	5	125	
Mudhens—killing, possession, closed season	1	10	
Quail—killing, possession, closed season	8	150	90
Pheasants—killing, possession	8	260	
Rabbits—cottontail	6	150	
Non-game birds—killing, possession	7	225	
Night hunting	19	450	
Trespassing	5	145	
Game refuge—hunting or possession of firearms	2	30	
Totals	144	$3,860	263

FISH CASES.

January, February and March, 1924.

	Number arrests	Fines imposed	Jail sentences (days)
Angling without license	16	$480	40
Trout—taking, possession, closed season	13	375	
Trout—taken other than with hook and line	3	75	
Black bass—taking, possession, closed season	7	345	
Sun fish—taking, possession, closed season	1	20	
Striped bass—undersized, over bag limit	8	250	
Striped bass—closed season, sale	3	50	
Salmon—over bag limit	1	100	
Crabs—taking, possession, undersized	9	130	
Crabs—taking, possession, closed season	1	100	
Clams—over bag limit, undersized	33	825	50
Abalones—over bag limit, undersized	48	1,650	
Abalones—taking, possession, closed season	18	400	90
Lobsters—taking, possession, undersized	12	415	
Lobsters—taking, possession, closed season	1	50	
Fishing without commercial fishing license	9	90	
Barracuda—possession, undersized	1	25	
Ship fish by parcel post	1	25	
Nets, traps—illegal possession or use of	3	25	30
Totals	188	$5,430	210

SEIZURES OF FISH AND GAME

January, February and March, 1924.

Ducks	542	Striped bass, pounds	384
Geese	14	Barracuda, pounds	600
Pheasants	3	Halibut, pounds	350
Non-game birds	53	Crabs	3,996
Deer meat, pounds	240	Crab meat	30
Deer hides	4	Lobsters, pounds	333
Rabbits	12	Abalones	301
Trout	84	Abalones, pounds	565
Black bass	8	Clams	3,437
Black bass, pounds	30	Smelts, pounds	19
Salmon, pounds	3,220		

STATEMENT OF EXPENDITURES.

For the Period January 1, 1924, to March 31, 1924, of the Seventy-fifth Fiscal Year.

Function	Materials and Supplies	Salaries and Wages	Service and Expense	Property and Equipment	Total
Administration					
Commissioners			$100 34		$100 34
Executive offices	$11 97	$3,692 57	1,387 81	$8 80	5,101 15
Printing	1,700 87				1,700 87
Research and publicity	29 88	1,050 00	131 69	97 20	1,308 77
Accident and death claims			345 39		345 39
Department totals	$1,742 72	$4,742 57	$1,965 23	$106 00	$8,556 52
Commercial Fish Culture and Conservation					
Superintendence	$38 72	$1,950 00	$753 42	$0 09	$2,742 23
Inspection and patrol	458 86	6,043 61	1,086 46	5 43	7,594 36
Research	158 20	3,221 27	471 92	31 21	3,882 60
Statistics	58 50	1,328 38	32 34		1,419 22
Propagation and distribution of salmon	1,028 55	2,419 19	143 25	85	3,591 84
Department totals	$1,742 83	$14,962 45	$2,487 39	37 58	$19,230 25
Sporting fish culture					
Superintendence	$19 98	$2,475 00	$531 77		$3,026 75
Printing	61 20				61 20
Propagation and distribution of trout	2,364 54	10,111 78	1,044 46	$16 01	13,536 79
Department totals	$2,445 72	$12,586 78	$1,576 23	$16 01	$16,624 74
Patrol and law enforcement					
Prosecutions and allowances			$36 95		$36 95
General patrol	$274 66	$30,112 36	$18,704 80		$49,091 82
Department totals	$274 66	$30,112 36	$18,741 75		$49,128 77
Fish and game conservation					
Mountain lion hunting		$375 00	$198 34		$573 34
Mountain lion bounties			2,620 00		2,620 00
State fair exhibit					
Department totals		$375 00	$2,818 34		$3,193 34
License commissions			$6,997 10		$6,997 10
Tahoe camping ground					
Grand totals	$6,205 93	$62,779 16	$34,586 04	$159 59	$103,730 72

STATEMENT OF INCOME.

For the Period January 1, 1924, to March 31, 1924, of the Seventy-fifth Fiscal Year.

License sales	Detail	Total
Angling	$34 573 00	
Hunting	57,477 00	
Market fishermen's	5,070 00	
Wholesale fish packers'	105 00	
Trapping	557 00	
Game breeders'	135 00	
Fish breeders'	45 00	
Total license sales		$97,962 00
Other income		
Court fines	$10,082 85	
Fish packers' tax	13,549 49	
Fish tag sales	757 96	
Game tag sales	28 59	
Sale of deer hides	41 00	
Sale of catfish	100 00	
Interest on bank deposits	312 09	
Total other income		$24,871 98
Total income		$122,833 98

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